



SATURDAY, DECEMBER 16, 1871.

## Cochran's Patent Anti-Friction Car-Spring.

Our engravings illustrate an improved car-spring, the invention of Mr. J. W. Cochran, No. 189 Broadway, Room 3, New York city. The invention relates to that class of springs used for railway and other purposes, in which cylinders or columns of india-rubber are combined with helices of steel, the distinctive merits obtained by the improvements under consideration being that the rubber and steel are rendered coactive at the same time that, within certain limits, they are allowed to act independently of each other—the rubber, furthermore, being kept free from friction against metallic surfaces, and the helix or helices being sustained against buckling. Besides the avoidance of the difficulties just mentioned, the arrangement and construction of the parts is such that the maximum resistance of the rubber to compression is reached before the coils of the helices come together, so that the breakage of the latter, a frequent accident when helices are compressed to their utmost, is effectually guarded against. In the engravings, fig. 1 is a perspective of the spring with the caps removed; fig. 2 is a transverse vertical section of the spring, showing the caps attached, and in its expanded or non-compressed position; and fig. 3 is also a vertical transverse section, but with the spring compressed.

Fig. 1



Fig. 2

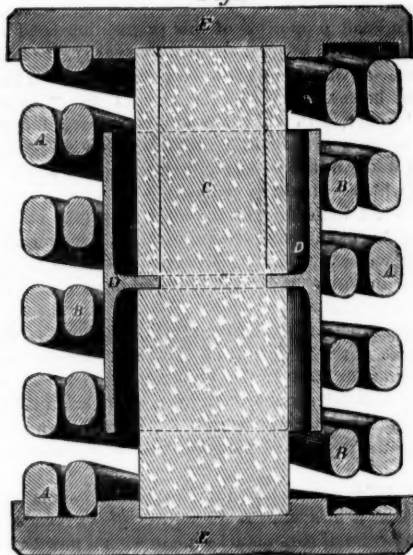
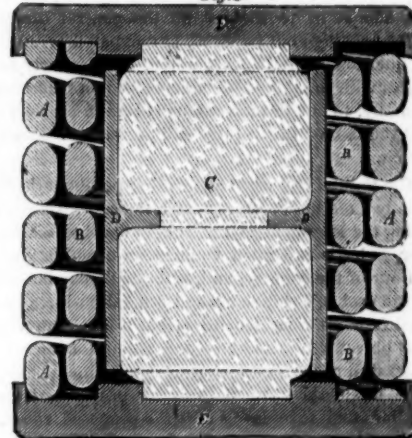


Fig. 3



The cylindrical rubber-block, *C*, is circumferentially channelled at its center to receive the inwardly projecting flange formed centrally in the hollow cast-iron hollow cylinder, *D*, the rubber projecting equally from each end of the shell. Around the cylinder, *D*, but not in immediate contact therewith, are the concentric steel helices, *A*, *B*, the ends of which rest in annular receivers in the caps, *E*, *E'*, as fully indicated in figs. 2 and 3. When in use, the action or operation of the spring is as follows:

Under moderate weight or pressure the helices and rubber yield simultaneously, the rubber having a free lateral or bulging movement, and from its more mobile nature rendering the action of the comparatively rigid helices more lively or immediately sensitive to the pressure than if the helices were made of such strength and stiffness as to sustain the entire load. As the weight is increased, the expansion of the rubber, which commences at its center, brings its middle portion against the surrounding cylinder, *P*, and this, preventing the further expansion of such portion, diminishes in like degree the yielding of the material to the superincumbent pressure. As the latter increases still more, the rubber, expanding its longitudinal contact with the cylinders each way from the center, is rendered progressively less elastic until it is brought into the position shown in fig. 3. In this condition the rubber is compressed to the utmost, and rigidly sustains the weight above it without further yielding. This maximum of compression being reached before the coils of the helices come together, any injury from such contact, sudden or otherwise, is provided against. It will be seen that the movement of the parts with reference to each other is from each end toward the center, indicated by the position of the annular flange provided in the cylinder, and which, inserted in the rubber, connects the two together and retains them in the requisite central position with reference to the surrounding helices. The longitudinal compression of the helices, corresponding to the motion relative to the end bearing of the springs, is kept from buckling, and all frictional contact consequently is avoided. In other words, the result mentioned is secured by the constant maintenance of the cylinder, *D*, at the middle portion of the helices. At the same time, the coming of the rubber in contact with the inner surface of the shell, being progressively outward from the center, without any dragging in contact with such surface, all friction from this source is also obviated. It may be remarked, in conclusion, that these springs have been on trial for several months upon the Boston & Albany Railway, with, it is stated, results of the most satisfactory character.—*American Artisan*.

## Contributions.

## A FRIENDLY WORD TO RAILROAD MEN.

Perhaps there is no class of men of equal numbers and intelligence who receive so little benefit from the experience of others in their calling as do railroad men. It is said there is a reason for all things, which is probably true; and there is no doubt a reason why railroad men do not write that others may read and gain a more thorough knowledge of matters pertaining to their calling, as do men in other industrial pursuits. What this reason is it is hard to conjecture. Railroad men are, as a class, as intelligent and capable of communicating their ideas as those engaged in any other pursuit, and why they do not take up the pen occasionally may be regarded as a mystery. If while waiting our turn at the dentist's to have an offending molar extracted, we find on the table a neat monthly publication devoted to all matters pertaining to that profession, and the work is pretty well "thumbed," we have a confidence that our offending grinder is to be extracted in a genteel manner and in accordance with the latest discoveries in that profitable if not pleasant profession. In running over the pages of *The Dentist* we see articles from a score or more of dentists, some of which have no doubt conveyed some new and valuable idea to the knight of the forceps who is about to operate on us,

engineer and his assistants, he should lose his head at once. It may be imagined that the multitude was tolerably quiet during the operation, which was a success, until the tremendous weight was within the fraction of an inch of swinging into place, when it refused to rise another hair's-breadth. The ropes which supported the hoisting apparatus had stretched beyond the calculations of the engineer, and he was in a fix. Just a little higher, and the thing was done; but the skill of the engineer was at fault. After a few moments of breathless silence, a sailor in the crowd sung out "Wet the ropes." The hint was acted upon and resulted in complete success; and Jack, instead of losing his head, gained a reward.

Here is an instance of a man of science getting a valuable idea from a man who made no pretensions to a knowledge of engineering, and instances of this kind are not wanting even in this engineering age.

Some of our shrewd manufacturers are beginning to see the advantage of employing mechanics and workmen who read, not "Dime Novels," or the obscene sporting publications of the period; but a young mechanic need have no better recommendation on applying for a "job," than to have a copy of some scientific and mechanical journal visible in his coat pocket. One manufacturer, employing less than one hundred men, pays for thirty copies of a weekly journal devoted to mechanics and engineering, and kindred subjects, and he considers his money well invested. His workmen are up with the

and we shall get the benefit thereof as well as he. We think he is rising in his profession because he reads, and we will patronize him hereafter. And when we visit the photographer, if we see his table covered with several numbers of *The Photographer*, we feel tolerably certain of getting a handsome picture, for we see that photographers write for the benefit of the profession. And so with all the trades and professions. And the man of science gains knowledge by reading the experience of others, and it is by reading as well as practice that any one rises in his calling. But some one must write or there will be nothing to read, and those who write should have some practical knowledge of what they write about. An awkwardly written article of a half a column by a hard-fisted mechanic is often of more value than an acre written by a theorist in polished style with a flourish of words far beyond the capacity of the average mechanic or railroad man to comprehend; and perhaps here lies the mystery of the great reluctance of mechanics and workmen generally to write their experience, viz., a lack of "big words" to explain their ideas. It is related of a certain king, who, like all kings of old, had a way of cutting off men's heads for trifles, that on the completion of a tower of immense height, which was to be surmounted by a statue of great weight, he gave notice that in case of failure or accident in placing the statue in its final resting-place, those in charge of the operation should lose their heads. As engineers at that period were not so bold as those of the Nineteenth Century, and owing to the dismal condition on which the work was to be undertaken (notwithstanding the tempting reward in case of success), it was a long time before the king could find an engineer who would venture to conduct the operation. Finally a man of great skill and confidence announced his willingness to undertake the feat. When all preparations were completed, the king gathered his subjects from far and near to witness the greatest engineering feat the world ever saw. He ordered that if any person spoke during the performance, other than the

times, posted on all new improvements and discoveries, and he reaps the benefit thereof.

And this man is not alone. Hundreds have adopted this plan for securing intelligent workmen, and with satisfactory results. And corporations employing men enough for a small army find it greatly to their advantage to supply their men with such reading matter as will instruct and improve, elevate and strengthen, rather than poison and destroy their minds.

Some railroad managers have also discovered that a first-class railroad paper in the hands of their employees greatly increases the value of their services. The Vermont Central road has a library of 2,000 volumes, at St. Albans, for the use of their employees. Another road with headquarters in Boston has a still larger library, with spacious reading rooms; and some other roads have done likewise. All this is not solely for the benefit of employees, but the owners and managers "share in the fruits thereof." And those who have access to these libraries do not gain their most valuable information from elegantly bound volumes, but much of it is gained from periodicals devoted to matters pertaining to their calling. In these publications we find now and then a new and valuable idea from some practical man who has discovered a new process for some important operation; another has discovered the cause of, and a remedy for, some serious evil, which discovery may be worth thousands of dollars to any railroad company who will put it in practice.

Another peculiarity of railroad men is their great reluctance to ask questions. If they desire or need information they will not ask for it for fear of exposing their ignorance. Now this is all wrong. If you wish to learn something that you consider would be of value to you and your company, and are ashamed to ask your acquaintance, write to the editor of some railroad paper, and he or some of his readers will furnish the desired information. And if the information is valuable it will benefit hundreds of others who read the paper. If the information should not be correct or should not coincide



with the views of others who have studied the matter, it would be argued pro and con until a correct solution of the problem was obtained. The press is the great disseminator of knowledge, and all railroad men should use that medium for our common benefit.

WM. S. HUNTINGTON.

#### RAILWAY LOCATION.

The proper and judicious location of a railway is certainly of the greatest moment to its future success and cost; and while perhaps the majority are so located at first, there are others in which errors of considerable magnitude have been committed, causing perhaps the construction of many miles of new track, and sometimes delays after the road has been in operation. The fault is incompetent engineering most generally, but not altogether; for it is not unusual that scheming directors or agents cause the engineer to go wrong just for the sake of making a little money themselves. But, of course, the censure naturally falls on the engineer from subsequent observers, whether he deserves it or not.

Railway directors should use good judgment and great care in the selection of their chief engineer, and not employ whoever is handiest, as is often the case, unless they know him to be a man whose professional reputation on other railways is a guarantee for the faithful discharge of his duties in the interests of the enterprise; for on his skill and fidelity much must depend. The duty of location is a very important one to the public as well as the proprietary, both being interested in procuring the cheapest transport. In proceeding upon it, the first object should be to understand the general direction of traffic existing and required, as compared with the line in question, as railways running at or nearly at right angles with the line of commerce seldom succeed; and, secondly, to obtain the straightest line and easiest grades that the face of the country and pecuniary resources will permit.

The termini and often some other points in the line are usually fixed by the charter, and the responsibility of locating the intermediate line should devolve on the engineer, as he is best fitted to make an examination of the contour of the country, and, in doing so, can better judge of the probable shipments and general business to be derived from different localities; but it is seldom that any local object will justify an elongation of the line. Having satisfied himself as to what is approximately the best route, he should proceed to secure proper assistance to run lines and take levels over the proposed route, from which maps and profiles can be made enabling him almost at a glance to select the most practicable line. On some lines the physical formation of the country will at once dictate the proper location. Others require extensive surveys and reconnaissances. In a very rough and mountainous country, where it is known that but one belt or strip is practicable, it is sometimes very expedient to have a moderately accurate topographical survey made of the whole, by running several lines and levels the entire length of that strip, parallel to each other, if possible, with notes approximating the intervening country. From such a survey as this planned it is comparatively easy to select the best location on paper, which can be carried out in the field afterwards with success.

Very good approximate preliminary surveys can be made by observing the probable fall of streams and the direction and distance they run, which will give one a very good idea of the height to be overcome. Different kinds of timber are also indicative of high or low ground, as also the nature of soil (sometimes very important). For instance, black ash, red elm, cedar and burr oak indicate wet or low land; pine, hemlock, black and red oak, sandy or high land; white oak and iron wood, clay and high land; while hard maple, beech, lime and hickory require a good soil, but I have known them to grow on limestone and gneiss rocks with only three inches of soil. Following the course of streams is sometimes a good location, if they do not rise too rapidly, are not too tortuous and run in the required direction. Water-sheds are not safe to follow, unless in a flat country, when they become the best location, if lying in the direction desired; but of course discrimination and existing circumstances must decide. In establishing gradients it is obviously necessary that they should be as easy as circumstances will allow. The level is best for general traffic, but should there be an excess of freight one way it would be better to have the inclination corresponding. In places where a certain elevation has to be made it is better to have short heavy grades interspersed with levels than one continuous moderate grade.

Railroad cars are made to run on straight lines, therefore the less deviation from them the better. However, deflections must be made to suit the country, necessitating curves; these should have the largest radii possible consistent with the formation of the ground; but it is not

considered advantageous to put in long curves of fifty or sixty thousand feet radius where much shorter ones of five to ten thousand feet radius will do; for the wear on the outside rails is greater in proportion, and, consequently, they will cost more to keep in repair.

T. J. NICHOLL, Civil Engineer.

#### The Use of Ammonia to Prevent and Remove Boiler Incrustations.

SAN FRANCISCO GAS WORKS, }  
SAN FRANCISCO, Cal., Nov. 22, 1871. }

TO THE EDITOR OF THE RAILROAD GAZETTE:

Noticing the "Report on Boiler Incrustations" in your issue of the 11th inst., I write to call your attention to the fact that the volatile alkali ammonia acts to prevent in great part, if not completely, the formation of boiler scale.

Isolated gas-makers, here and there, have noticed an absence of scale in their boilers where the condensing water (charged with a low percentage of ammonia) is used for feed; and some experiments made in this city upon a practical scale, with ammonia specially prepared for the purpose, have fully borne out these observations.

The San Francisco Gas Company is almost the only one in America which works up its by-product of ammoniacal liquor into the pure and valuable commercial forms. Among these is one which we designate "Ammoniacal Preparation for the Prevention and Removal of Boiler Scale," and it is this to which I wish to call the attention of the railway interest.

When a small proportion of this preparation is added to cold water, even of high comparative purity, the mixture at the end of ten minutes becomes milky and precipitation begins. Even in the case of the "Spring Valley" water, with which the city is supplied, the action is marked and rapid; while from the somewhat brackish water of the wells, the precipitate is of a turbid foulness which is almost incredible.

As a second indication of its effect, if a tube coated with scale be immersed in this preparation, the scale will almost immediately begin to separate and settle to the bottom of the jar of immersion in the form of a reddish, powdery precipitate.

Working from these observed facts, a 20-horse power boiler in use at the Vulcan Iron Works of this city was treated to a daily dose of the preparation. The scale at beginning was half an inch thick upon the tubes in many places; but this was soon entirely removed, and a pint per day of the liquid kept the boiler perfectly clean thereafter.

Now if, in the first place, this form of ammonia precipitates and neutralizes the impurities of cold water; if, in the second, it cuts actual scale to such a powder as may easily be washed or blown out; if, finally, these two valuable effects of prevention and removal are demonstrated, have we not made a great step toward the solution of the problem?

I am neither a railway mechanic nor a chemist; but these three suppositions are so conclusive facts to my own mind as to warrant this note.

The price of this preparation is \$10 50 per case of ten gallons.

My impression is, that by its addition in required percentages to the supply tanks of the water stations, water of nearly or quite absolute purity can be secured by all railways.

The subject is at least worth discussion, and there is no fitter arena for this than the columns of your valuable journal.

JAMES R. SMEDBERG,  
Consulting Engineer, S. F. Gas Co.

#### RAILROAD CONSTRUCTION IN VICTORIA, AUSTRALIA.

In 1860 Mr. William Elsdon, an engineer of Melbourne, Australia, was commissioned on the part of the colony of Victoria to visit Europe and the United States and examine the modes of construction, equipment and general management of railroads, with a view to the adoption of some system for Victoria better suited to its wants than those previously constructed there. These roads have been very substantially constructed, but at what would be considered in this country an extravagant cost; while, the country being new and but partially developed, the receipts were entirely too small to justify the investment. In his report, published by the government of Victoria last spring, he refers to and gives in an appendix the reports of Mr. George P. Bidder and Mr. John Hawkshaw, eminent English engineers, on the subject of introducing narrow-gauge lines into India. The following is a portion of Mr. Bidder's report:

GENERAL COMPARISON BETWEEN THE PRESENT AND NARROWER GAUGES, PARTICULARLY AS REGARDS THE COST.

5. There is no doubt a popular impression among persons not fully conversant with the principles of railway

construction, that the cost of a railway and its appurtenances must vary according to the width of the gauge. I presume such persons adopt, without thinking, the analogy of a road or a canal, and imagine that, as these necessarily cost more when they are wider, a railway must do the same if its gauge is increased.

But this impression is so transparently fallacious that I can scarcely imagine it to be seriously adopted by persons accustomed to railway engineering. It must be obvious that the important elements which determine the cost of a railway are the size and weight of the vehicles which are to be used upon it; and it requires but little consideration to show that these have no necessary dependence on or connection with the width between the rails. It is possible, with the same gauge, to use either broad or narrow, light or heavy vehicles; and it is equally possible to make the same class of vehicle run on either a broad or a narrow gauge.

6. A reference to the principal works of a railway will make this clear. Take first the works above the line, such as cuttings, over-bridges and tunnels; it evident the widths and consequent cost of these must be determined by the width of the carriages that run through them, and that it can matter nothing in this respect what distance the wheels under the carriages are apart from each other. Then, as to the bridges under the line: the main elements of these usually consist of two iron girders, the strength and cost of which depend on the weight to be carried, and can be but little affected by the width apart of the rails.

In embankments, also, if of any magnitude, for a single line, a certain width is necessary for stability, and for allowing a pathway outside the trains, and this could not be reduced (with the same width of vehicle) by narrowing the gauge. The cost of the permanent way is but little affected. For a given load, conveyed at a given speed, rails of the same weight must be used, and the distance they are placed apart would make but little difference. The cost of land and stations, fencing, telegraphs and other accessories, would be in any case the same.

The cost of the rolling stock is in the same category. An engine of the same power would cost the same whether the wheels were 5 feet 6 inches or 3 feet apart; the length of axles and cross framing would be somewhat more in the former case, but this would be compensated for by the increased difficulties of construction in the latter. In wagons and carriages of the same size and strength the only difference would be in the length of the axles, which would be very trivial.

7. The fact of the cost being but slightly dependent on the gauge was brought out strongly in the discussion of the Great Western system. In that case Mr. Brunel originally contemplated using only the same width of carriages as on the narrow gauge—placing the bodies entirely between the wheels—but he afterward thought it expedient to take advantage of the broader base to use wider vehicles; and for this and other reasons the width of the land and works was considerably increased; but even under this condition the cost of the line was only increased by about 7 or 8 per cent.

8. In fact, the cost of a line is measured, not by the gauge, but by the quantity of traffic and the speed at which that traffic is required to be carried.

If on any given line the traffic is small and a low speed will suffice, there is no difficulty whatever in designing lighter engines, smaller and lighter carriages and wagons, lighter rails and lighter and less expensive works generally, by which means the cost of a line may be reduced to a minimum without making the fatal mistake of altering the gauge.

This fact is in accordance with experience in this country. In the early days of railways, when the Liverpool & Manchester line was constructed, the rails, engines and carriages were light, according to the ideas then entertained of the probable traffic; the rails were 30 or 40 pounds to the yard, and the engines were under 10 tons weight. It was only as the traffic and speed increased that the provisions necessarily became more expensive; the gauge remained always the same. It is true that the cost of that and other early lines was great, but the outlay was due to the expensive character of the works, with which the mere transverse width apart of the wheels of the vehicle had nothing to do.

9. In the published dispatches on railway extension in India, it seems to be assumed throughout that a reduction of gauge is essential to and identical with a reduction of cost; but no kind of reasoning or proof is given to support such an assumption. Moreover, in regard to the inconveniences of the break, the arguments are reproduced which were urged in the earliest agitation of the question; such for example as the statement that the change of vehicle for goods was only equivalent to the cost of transport over 10 miles of railway. It ought to have been borne in mind that when the break was put to the test of experience in the hands of the same company, and under the most favorable circumstances possible, all these arguments were disproved, and the result was the total abandonment of a system for the establishment of which millions of money had been expended.

10. The question of the possibility of constructing cheap railways in districts where the traffic will not warrant a large outlay is by no means confined to India. Such railways are now required in England, and I may mention a case where one of our largest companies has lately constructed a line 22 miles long, to accommodate a very poor district, at the smallest possible outlay. They have used specially light rails and specially light engines, and all the arrangements have been of the cheapest possible character; and the cost of the line, including expensive land, has been kept down to a little over £4,000 per mile. In another line, eight miles long, it is intended to carry the economy still further, but in none of such cases would any railway authorities in England dream that it was necessary to reduce the gauge.

11. There is an impression that a narrow gauge is more suitable for sharp curves. This would be of no moment in the plains of India, but it might perhaps be considered of weight in a rough country, such as the upper part of the Peshawur line (as I understand) is likely to go through. The force of this argument is, however, very



much overrated. In any case the extra resistance from friction is but small in comparison with the whole power required, particularly on steep gradients (which generally accompany sharp curves) and by special provisions, of bogie frames and other appliances, the inconveniences of sharp curves, with the present gauge may be made insignificant.

12. I think it not improbable that the present proposal may have partly arisen from the attention lately drawn to a peculiar kind of locomotive engine, designed by Mr. Fairlie, and perseveringly thrust into public notice. It consists of two boilers connected together with the fire-boxes in the middle; these rest on bogie frames at each end, the wheels of which are turned by two distinct sets of engines in the usual way. The advantages claimed for this kind of engine are that great power may be obtained by it on a narrow gauge and that it has great facilities for going round sharp curves.

I have no hesitation, however, in saying that I consider this kind of engine altogether inferior to an arrangement which has been long adopted where great power is required, *i. e.*, by using two powerful single tank engines coupled together. These may be easily designed to suit sharp curves, and they are much more simple and manageable; they are fired and tended much more efficiently and with much less distress to the men, particularly in hot climates; they can be used either together or separately as may be required, and either of them can be taken out of use, for repair or for cleaning, without interfering with the other.

I have seen the accounts of the experimental performance of the Fairlie engines on various trials in England, and on others (where the results have been even less favorable) in foreign countries; but taken at the best, there is nothing remarkable about them, certainly nothing beyond what the same amount of boiler power would perform if it were applied in the usual way. The general usefulness of such engines is far inferior to that of the kind called "contractors' engines" used for temporary purposes on rough roads, and the contrivance is, in my opinion, only a bad way of using two engines combined.

13. To sum up this part of the subject, the narrow gauge presents, in my opinion, no advantages which should lead to its preference, in any case, over the ordinary gauge of India, whereas the wider gauge has most important advantages over the narrower.

By its broader base it gives a steadier motion and the probability of greater safety at a high rate of speed, and it admits of important advantages in the construction of the engine, particularly where much power is required. I have shown that it allows any reasonable degree of economy to be effected by lightening the works and the stock; but while it admits of this it also provides (which a narrower gauge does not) for a return at any time to the full carrying capabilities of the line, both as regards power and speed, when increased traffic may require it. In short, the broad gauge has all the advantages of the narrow, while the narrow possesses none of the merits of the broad.

It must always be borne in mind that experience has shown that the constant tendency in railway works and railway plant is to *enlarge* dimensions and strengths rather than to diminish them; to *concentrate* the load rather than to diffuse it. In the present Indian gauge there is a most valuable base for any amount of carrying power, which it would be folly to give up; with a narrow gauge, such as 3 feet or 3 feet 6 inches, there would only result what I may call an *exceptional toy-line*; the restricted fundamental dimensions of which would be forever a bar to the progress or development which future circumstances might require.

The following is a portion of Mr. Hawkshaw's report:

#### SAVING BY ADOPTING A 3-FOOT 6-INCHES GAUGE COMPARED WITH EXISTING INDIAN RAILWAYS.

The saving in original outlay on the two gauges will be smaller than is generally supposed from the circumstance that a very large portion of the first cost of railway is unaffected by the width of gauge.

For whatever the gauges may be, the slopes of cuttings and embankments, the side ditches, walls and fences are a constant quantity. The space that must be allowed beyond the rails for clearance of vehicles will be the same on both gauges; therefore, as it respects earthworks, where the depths of cuttings and heights of embankments remain the same, the saving in the cross section of the railways will be represented by a parallelogram of the width of the difference of gauge and of the depth and height corresponding with that of the cuttings and embankments.

Assuming slopes of  $1\frac{1}{2}$  to 1, which may be taken as average slopes, reducing the gauge to 3 feet 6 inches would, in cuttings and embankments of 5 feet, produce a saving amounting to 8.2 per cent.; of 10 feet, to 6.2 per cent.; of 15 feet, to 5 per cent.; and of 20 feet, to 4.2 per cent., the rate of the saving diminishing as the works increase in magnitude.

With regard to bridges across rivers, which form so considerable a portion of the cost of the Indian railways, there will also be less saving than would at first sight appear.

The piers of each bridge in every important case require, for the sake of lateral stability, a certain mass and weight, and in most of the many bridges I have designed for India could not be reduced to any extent worth notice. Indeed, at present the piers of lofty structures, though designed for one line of way only, have frequently, for the sake of lateral stability, to be made wide enough and strong enough to carry two lines of way, though only one line of way is placed upon them. The longitudinal girders and cross girders would be somewhat reduced in cost, and also the covering of timber or iron.

The weight of the longitudinal girders spanning the piers would be governed mainly by the weight of the engines. On this point I may here remark that I have not heard it anywhere proposed that engines for the narrower gauge should weigh less than 10 tons. I think it better, with my present information, to assume engines

weighing 16 tons, and the whole rolling-stock to be so arranged that not more than 4 tons should be brought upon the rails by one wheel.

But if a railway were constructed on a gauge of 3 feet 6 inches, a lighter permanent way could be introduced. The weight of the rails in India is for the most part about 75 pounds per lineal yard; I will assume it reduced to 45 pounds per lineal yard, and the chairs, fish-plates and fastenings in a corresponding degree. The sleepers would be smaller and there would be less ballast, say in both cases to the extent of 20 per cent. I estimate that the saving in cost by introducing a lighter permanent way on the narrower gauge would be about £1,000 per mile.

The engines could be made smaller than those now in use so as to cost less than £1,000 per engine, but as engines equally light could be used on the existing railways no reduction, perhaps, should be made on this account, but nevertheless I have included it. The carriages and wagons would also be smaller, and the cost of each vehicle would be reduced, but the diminution in their size would necessitate a greater number to carry any given quantity of persons or things. No saving, therefore, can properly be included for vehicles. Indeed the cost of the carriages and wagons might prove greater on the narrower than on the broader gauge. Stations would be much the same and might cost more, owing to the greater length of sidings and platforms required to accommodate a given amount of traffic. Residences and offices could not be effected by gauge. Goods sheds, covered sheds for engines, carriages and for repairs, although they might be narrower, would have to be longer, and the cost of these would be much the same in both gauges.

Land in India costs little, and the saving of land would be represented by a strip of the width of the differences of the two gauges, *viz.*, 2 feet, and of the length of the line; and, bearing in mind what I have previously remarked about slopes of earthwork, width for ditches, fences, &c., the saving from this could not amount to more than a quarter of an acre per mile.

But it may be alleged that sharper curves could be used on a narrower gauge than are applicable on the broader gauge, whereby, in hilly ground, the earthwork could be diminished. Advocates of narrow gauges having laid stress on this, I have examined this question minutely and at some length, and in doing so I have assumed, as before mentioned, that the wheel base of the vehicles, is, in each case, double the gauge, and I arrive at the following conclusions:

1. As it respects the sideways sliding, due to the oblique position of the wheels to the rails, it is as the length of the wheel base, and, therefore, if, as I assumed it to be, the wheel base be always twice the gauge, it will to a small extent be in favor of the narrower gauge; but if in consequence of the carriages being narrower than on the broader gauge the wheel base were required to be as long as on the broader gauge, the saving on this head would vanish.

2. As it respects circumferential slipping, arising from the outer rail on curves being longer than the inner one, it is directly as the gauge and would be in favor of the narrower gauge.

3. As it respects the nip or pressure against the rails, arising from the tendency of the leading end of the vehicles on curves to swerve outwards, it will, where the wheel base is proportioned to the gauge, be the same on both gauges.

Without direct experiments it is hardly practicable to arrive at what would be equivalent curves on the two gauges, but they would not differ to any such extent as would enable any important saving to be made, even in hilly countries where railways are more or less tortuous, and in flatter countries sharp curves are unnecessary, and the reduction in cost under this head by introducing sharper curves will be governed by the proportion of flat to hilly districts, which may be taken say as 3 to 1. Assuming the saving in earthwork by the narrower gauge in hilly districts to be £800 per mile, it would be reduced to £200 per mile if applied to the average of railways, and will be nothing on railways in flat districts.

#### EVILS OF BREAK OF GAUGE.

In the long and repeated discussions which occurred in this country years ago on the evils of break of gauge, it was urged by those who supported the differential gauge that the inconvenience would be measured by the expense and time occupied in shifting goods from one wagon to another where the change of gauge occurred; and this was put by them as being equal to the cost and time involved in ten miles of railway transit. It was variously reckoned at 4d. a ton, at 8d. a ton, and at 1s. a ton; and this charge, could it have been arrived at, would have been capitalized and added by me to the credit of the lighter railways on the present gauge, as it will become a charge on the break of gauge if introduced.

But experience has shown that the evil effects of break of gauge under this head must be put higher than this, or the Great Western Railway Company could never have been justified in spending the large sums they have done in putting the narrow gauge on their broad gauge line; and although I cannot imagine that an experiment which has already been made in this country with such results will be again tried in India, I venture to prophecy that if it be, the time will come when the Indian Government will be called upon to expend more money to remedy the evil than they can ever save by introducing it.

In conclusion, I must state that the question on which I have had to report being hypothetical, I have been compelled to treat it by hypothesis. The assumptions I have made are, I think, fair for contrasting the suggestions I have dealt with; but the comparative results will not be materially affected by adopting other dimensions than 3 feet 6 inches, which I have assumed for the narrower gauge. If smaller engines were called for, they can be applied both on the narrower gauge and on the lighter railway on the present gauge. Locomotive engines when I first became connected with railways weighed only 10 tons on the 4ft. 8in. gauge, and at the harbor works at Holyhead we have had locomotives working weighing as

little as 10 tons on a 7-feet gauge, so that if the scale I have assumed for the light railway be too expensive, it could be still further reduced; but I think it best to make the light railway strong enough to bear the existing carriage and wagon stock; for if this were not done, the great advantage of using the whole of the present Indian vehicles upon it would be lost.

#### REPORT OF THE OVERSEER OF WORKSHOPS AND LOCOMOTIVES.

The following is the report in full of Mr. William Meikle, the Locomotive Overseer of the Victoria Railways, dated April 18, 1871, and directed to the Commissioner of Railways:

SIR: I beg to lay before you the following, relative to light railways and their working, and first have to say that—

To have a break of gauge would introduce so many evils as to go far to neutralize any advantage derivable from the cheaper construction of a narrow gauge, and besides, the existing gauge is quite compatible with cheapness of construction.

Our existing roads are made strong enough in their earthworks, their rails, their bridges, and all the details connected therewith, to bear the weight put upon the driving wheels of the heaviest engine, which amounts to 7-tons per wheel, and also strong enough to bear that weight running at 50 miles per hour—a speed run at intervals and parts of the road every day.

Now the heaviest weight upon the loaded wagons is only 3½ tons per wheel. If these only had to run upon the road, it might be reduced to half of its present strength in all the essential particulars which go to make a railway, and it is quite easy to make an engine equal to half the power of one of our present class, that shall have no more weight on any one wheel than three tons, which is half a ton less than the weight on the wheels of a loaded wagon. All that is necessary to be done to make a cheap railway, and yet retain the present gauge, is to make it one-half as strong and use light engines.

But as these engines referred to would only be half as strong as our existing ones, they could only take half the loads; when traffic was very light they would be sufficient, and when heavier traffic came two such engines would buckle on together managed by one pair of men.

There is nothing experimental about this; it is only what has been done successfully and well; no question about Fairlie's experiments is involved with it, which experiments may or may not turn out a success, but even if successful, would do no more than can be done with the ordinary and well-tried type of modern locomotive engines.

Fairlie does not profess to get any more out of a pound of coal than his neighbors do, but tries to do better than they in getting round a very sharp curve.

To do this he introduces an invention of old George Stephenson's, which is beset with mechanical difficulties so great as to have proved a failure, at any rate in *Queensland*. Fairlie and his friends say that it failed from bad work, which is simply saying that the arrangements are such as to require a nicety of workmanship which an ordinary engine can do without. One thing is certain, that Fairlie has altered his design several times, showing that an acknowledged difficulty exists. Till that difficulty be overcome, it will only be prudent to make use of what is known to do well, following the method used upon the Apennine incline, on the Genoa & Turin Railway, where two engines coupled together in the way named by me, and managed by one pair of men, conduct the traffic up a gradient 1 in 36.

Such engines would go round any curve necessary to be made; would, in fact, come up *Spencer street* were a railway laid down by the side of the railway reserve cross to Collins street, at the point where the centers of the two roadways meet, and go up the left pavement of Collins street. A sharper curve than this should not be wanted in a new country, and is very seldom wanted in any country, new or old.

Referring again to Fairlie's engines, and speaking as a practical mechanic, who has had at least as much experience in the running and repairing of locomotive engines as any man in the colony, as much as most men in Great Britain, and knowing the diseases to which the engines are liable, I beg to point out that, wherever Fairlie's engines are run, they will be a source of trouble in one very essential part, namely, the junction of the steam pipes; and I think it very likely that they will be one day out and two days in.

Fortunately, however, they are in no respect essential to a light and cheap railway.

The plan I thus propose would allow the existing trucks and carriages to pass freely on either the light or heavy railroad; would allow the light engines to run on either road also, but would keep our heavy engines to the old line.

#### THE MASTER MECHANICS' ASSOCIATION.

##### Constitution as Amended at Annual Meeting, 1871

##### PREAMBLE.

We, the undersigned, railway master mechanics, believe that the interests of the companies by whom we are employed may be advanced by the organization of an association which shall enable us to exchange information upon the many important questions connected with our business. To this end we do establish the following:

##### CONSTITUTION.

##### Article I.

SECTION 1. The name and style of the Association shall be the AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.

##### Article II.

SECTION 1. The officers of the Association shall be a President, a First and Second Vice-President, a Secretary and a Treasurer.

SEC. 2. The above-named officers shall be elected separately, by ballot, at a regular meeting, and a majority of all votes cast shall be necessary to a choice.

SEC. 3. The officers shall be elected for a term of one year, but in the event of the election being postponed shall continue in office until their successors shall be elected.

SEC. 4. Two tellers shall be appointed by the President to conduct the election and report the result.



## Article III.

SECTION 1. It shall be the duty of the President to preside in the usual manner at all the meetings of the Association, and approve all bills against the Association for payment by the Treasurer.

SEC. 2. It shall be the duty of the Vice-Presidents, according to rank, to perform the duties of the President in his absence from the meetings of the Association.

SEC. 3. In case of the absence of both President and Vice-Presidents, the members present shall elect a President pro tempore.

SEC. 4. It shall be the duty of the Secretary to keep a full and correct record of all transactions at the meetings of the Association; to keep a record of the names and places of residence of all members of the Association, and the name of the road they each represent; to receive and keep an account of all money paid to the Association, and at the close of each meeting deliver the same to the Treasurer, taking his receipt for the amount; to receive from the Treasurer all paid bills, giving him a receipted statement of the same.

SEC. 5. It shall be the duty of the Treasurer to receive all money from the Secretary belonging to the Association; to receive all bills against the Association, and pay the same, after having the approval of the President; to deliver all paid bills to the Secretary at the close of each meeting, taking a receipted statement of the same; to keep an accurate book account of all transactions pertaining to his office.

## Article IV.

SECTION 1. The following persons may become members of the Association by signing the Constitution, or authorizing the President or Secretary of the Association to sign for them, and paying the initiation fee of one dollar: Any persons having charge of the Mechanical Department of a railway, known as "Superintendents," or "Master Mechanics," or "General Foremen," the names of the latter being presented by their superior officers for membership.

SEC. 2. Civil and mechanical engineers and others whose qualifications and experience might be valuable to the Association may become associate members by being recommended by three active members. Their names shall then be referred to a committee, which shall report to the Association on their fitness for such membership. Applicants to be elected by ballot at any regular meeting of the Association, and five dissenting votes shall reject. The number of associate members shall not exceed twenty. Associate members shall be entitled to all the privileges of active members excepting that of voting. Also, one Mechanical Engineer or the representative of each locomotive establishment in America.

SEC. 3. Any person who has been or may be duly qualified and signs, or causes to be signed, the Constitution, as member of the Association, remains as such until his resignation may be voluntarily tendered.

SEC. 4. All members of the Association will be liable for such dues as may be necessary to assess to defray the expenses of the Association.

## Article V.

SECTION 1. The regular meeting of the Association shall be held annually on the second Tuesday in May.

SEC. 2. Regular meetings shall be held at such place as may be determined upon by a majority of the members present at the previous meeting.

SEC. 3. An adjourned meeting may be held at any time and place that a majority of the members present at any meeting may elect.

SEC. 4. The regular hours of sessions shall be from 9 o'clock A. M., to 2 o'clock P. M.

## Article VI.

SECTION 1. This Constitution may be amended at any regular meeting of the Association by two-thirds vote of the members present.

## NAMES AND ADDRESS OF MEMBERS OF AMERICAN RAILWAY MECHANICS' ASSOCIATION.

Anderson, H., late of C. & N. W. R. R., Chicago, Ill.  
Adams, G. Q., M. V. & W. R. R., Alexandria, Mo.  
Britton, H. M., W. V. R. R., Cincinnati.  
Beattie, J. G., S. M. & N. R. R., Sandusky, Ohio.  
Benton, C. E., I. & St. L. R. R., Mattoon, Ill.  
Brown, F. A., D. L. & W. R. R., Ithaca, N. Y.  
Brown, M. E., Erie R. R., Buffalo, N. Y.  
Boon, J. M., P. F. W. & C. R. R., Fort Wayne, Ind.  
Black, John, D. & M. R. R., Lima, Ohio.  
Baer, R. B., T. & N. O. R. R., Galveston, Texas.  
Burke, M. M., & Charleston R. R., Memphis, Tenn.  
Butterfield, J. G., St. Paul & S. C. R. R., Shakopee, Minn.  
Bushnell, R. W., C. & N. W. R. R., Chicago, Ill.  
Brar, M., F. & N. S. R. R., Flushing, N. Y.  
Brasto, L. C., L. & S. R. R., Wilkesbarre, Pa.  
Brown, H. L., Erie R. R., Eastern Division, Jersey City, N. J.  
Bryant, Wm. H., Pittsburgh, Fort Wayne & Chicago R. R.  
Bissett, F. A., M. & L. R. R.  
Bottis, Josiah, N. O. M. & Texas R. R., Mobile, Ala.  
Bromley, R., Cincinnati.  
Bullock, C. F., late of O. C. & N. R. R., Boston.  
Cullen, Wm., C. H. & D. R. R., Cincinnati.  
Cooper, W. E., Erie R. R., Hornellsville, N. Y.  
Chapman, N. E., C. & P. R. R., Cleveland, Ohio.  
Cummings, Samuel, P. F. W. & C. R. R., Allegheny, Penn.  
Cookidge, G. A., Fitchburg R. R., Charlestown, Mass.  
Congdon, A., late of Lake Shore R. R., Cleveland, Ohio.  
Connell, T., B. C. & P. R. R., Corry, Pa.  
Clark, D., L. V. R. R., Hazleton, Pa.  
Cooper, H. L., K. C. S. Jo. & C. B. R. R., St. Joseph, Mo.  
Church, F., T. & B. R. R., Troy, N. Y.  
Collings, E., C. & A. R. R., Camden, N. J.  
Colburn, R., N. & W. R. R., Norwich, Conn.  
Cook, James, Danforth & Cook Loco. & M. Co., Paterson, N. J.  
Calhoun, John C., N. M. R. R., St. Louis, Mo.  
DeClercq, A. H., T. P. & W. R. R., Peoria, Ill.  
Denmead, Thomas, P. C. & St. L. R. R., Dennison, Ohio.  
Danfield, S. D., P. & B. C. R. R., Chester, Pa.  
Dovine, J. T., W. & W. R. R., Wilmington, N. C.  
Durgin, J. A., Pittsburgh Locomotive Works, Pittsburgh, Pa.  
Drippes, Isaac, Pennsylvania R. R., Altoona, Pa.  
Davis, T. S., M. & St. P. R. R., Milwaukee, Wis.  
Eddy, Wilson, B. & A. R. R., Springfield, Mass.  
Elliott, Harry, O. & M. R. R., St. Louis, Mo.  
Edams, J. B., I. C. R. R., Amboy, Ill.  
Evans, T., C. & F. R. R., Catsauqua, Pa.  
Erwin, J. H., S. F. Division L. R. R., Sheboygan, Wis.  
Eastman, John U., N. & C. & N. W. R. R., Nashville, Tenn.  
Ellis, John C., Pres. Schenectady Loco. Works, Schenectady, N. Y.  
Freeman, W. G., C. & O. R. R., Richmond, Va.  
Forster, W. L., P. & E. R. R., Renovo, Pa.  
Fry, Howard, Grand Trunk R. R.  
Gibbs, E. B., late of St. L. & I. M. R. R., Carondelet, Mo.  
Graham, C. L., B. & R. R., Kingston, Pa.  
Gayle, J. B., R. & G. R. R., Raleigh, N. C.  
Glass, G. W., A. V. R. R., Pittsburgh, Pa.  
Garfield, E., H. P. & F. R. R., Hartford, Conn.  
Garrett, H. D., P. R. R., West Philadelphia.  
Gregg, J. H., Erie R. R., Susquehanna, Pa.  
Gorman, T. G., T. W. & W. R. R., Springfield, Ill.  
Griggs, G. S., W. & N. R. R., Worcester, Mass.  
Griggs, Wm. H., N. Y. & O. M. R. R., Oswego, N. Y.

Grant, R. D., R. R. I. & St. Louis R. R., Boardtown, Ill.  
Grinnell, Frederick, Providence, R. I.  
Hay, Robert, Mineral Point R. R., Mineral Point, Wis.  
Hayes, S. J., Ill. C. R. R., Chicago.  
Hill, E. O., Erie R. R., New York.  
Hazel, H., M. H. & S. H. R. R., Schuylkill Haven, Pa.  
Haines, D. W., N. E. R. R., Florence, S. C.  
Holloway, J. W., C. Mt. V. & D. R. R., Mt. Vernon, Ohio.  
Ham, C. T., N. Y. C. R. R., Albany, N. Y.  
Haynes, N. W., O. & R. R., Alexandria, Va.  
Hull, A. S., C. V. R. R., Chambersburg, Pa.  
Hofecker, P., L. V. R. R., Weatherly, Pa.  
Hudson, W. S., Rogers Locomotive Works, Paterson, N. J.  
Hibberd, A. W., Erie R. R., Susquehanna, Pa.  
Hewett, John, A. & P. R. R., Franklin, Mo.  
Hall, George, W. C. & A. R. R., Wilmington, N. C.  
Haynes, O. A., St. Louis & I. M. R. R., Carondelet, Mo.  
Hibberd, A. W., Foreman Erie Railway.  
Jordan, W. L., Cumberland & Pa. R. R., Mt. Savage, Md.  
Johann, J. M., P. R. R., St. Louis, Mo.  
Jauriet, C. F., C. B. & Q. R. R., Aurora, Ill.  
Jackson, Wm., R. W. & O. R. R., Rome, N. Y.  
Jackson, J. A., C. & St. L. R. R., Bloomington, Ill.  
Kinsey, J. L., L. V. R. R., Easton, Pa.  
Kelly, J., P. & W. R. R., Providence, R. I.  
Keenan, A. J., D. & U. R. R., Dayton, Ohio.  
Kerr, Thomas, C. & A. R. R., Bordentown, N. J.  
Keller, S. F., P. M. R. R., East Saginaw, Mich.  
Kline, T. D., C. & A. R. R., Charlotte, N. C.  
Kidder, B. H., Buffalo, & Erie Div., L. S. & M. S. R. R., Buffalo, N. Y.

Little, O. H. P., Indianapolis, Ind.  
Little, H. A., Philadelphia, Pa.  
Loney, J., L. N. A. & C. R. R., New Albany, Ind.  
Lowe, T. N., P. C. & St. Louis R. R., Indianapolis, Ind.  
Lewis, C. N., N. C. R. R., Baltimore, Md.  
Lauder, J. N., N. R. R., Concord, N. H.  
Landis, H. D., B. & S. R. R., Bellefonte, Pa.  
Lincoln, H. A., Shore Line R. R., New Haven, Conn.  
Leech, H. L., Hinkley & Williams, Locomotive Works, Boston, Mass.

Lamb, J., D. V. R. R., Keokuk, Iowa.  
Moore, S., P. F. W. & C. R. R., Allegheny, Pa.  
Mulligan, J., C. R. R., Springfield, Mass.  
Meier, E. D., late of C. P. R. R., St. Louis, Mo.  
Marston, C. O., I. C. & L. R. R., Indianapolis, Ind.  
Moore, I. N., Pennsylvania R. R., Pittsburgh, Pa.  
Mullin, J., Jr., W. & A. R. R., Atlanta, Ga.  
Mullin, James, W. & A. R. R., Atlanta, Ga.  
Mitchell, A. L., V. R. R., Delano, Pa.  
Montgomery, James, M. & W. P. R. R.

Morse, G. F., Portland Locomotive Works, Portland, Me.  
Maynes, A. G., B. & D. R. R., Selma, Ala.  
McElroy, J., O. C. & A. R. R., Corry, Pa.  
McDowell, R., D. R. R., Lambertville, N. J.  
McKenna, J., I. P. & C. R. R., Peru, Ind.  
McAllister, W., W. J. R., Camden, N. J.  
McFarland, Joseph, M. & M. R. R., Montgomery, Ala.  
McFarland, John, R. & D. R. R., Richmond, Va.  
McCrum, J. S., Mo. R. R. & G. R. R., Kansas City, Mo.  
McCann, James, M. & W. P. R. R., Montgomery, Ala.

McVay, John, Western R. R. of Alabama, Montgomery, Ala.  
Nesbit, J. W., late of K. O. R. R., Covington, Ky.  
Pendleton, J. B., S. & R. R., Portsmouth, Va.  
Philbrick, J. W., M. C. R. R., Waterville, Me.  
Perry, E. A., C. & A. R. R., Keene, N. H.  
Perry, G. W., P. F. W. & C. R. R., Wilmington, Del.  
Parker, C. N., St. P. & P. R. R., St. Paul, Minn.  
Pierce, E., C. & P. B. R., Wellsboro, Ohio.  
Palmer, E. D., P. C. & St. L. R. R., Richmond, Ind.  
Parks, W. M., T. B. R. R., Taunton, Mass.  
Philbrick, S. M., L. & G. R. R., Lawrence, Kansas.

Perkins, E. F., C. P. R. R., St. Louis, Mo.  
Perrin, P. L., Taunton Locomotive Works, Taunton, Mass.  
Ray, W. F., T. W. & W. R. R., Fort Wayne, Ind.  
Richards, G., B. & P. R. R., Roxbury, Mass.  
Rennie, D. P., P. & C. R. R., Pittsburgh, Pa.  
Roop, F., N. P. R. R., Philadelphia.  
Robinson, W. A., G. W. R. R., Hamilton, C. W.  
Robinson, J. T., S. S. R. R., Peterburg, Va.  
Rowley, W. D., Central Branch U. P. R. R., Atchison, Iowa.

Somers, A. H., P. F. W. & C. R. R., Valparaiso, Ind.  
Skidmore, J., L. C. & L. R. R., Louisville, Ky.  
Shaver, D. O., Pennsylvania R. R., Pittsburgh, Pa.  
Smith, W. F., C. C. & I. R. R., Cleveland, Ohio.  
Swanton, W. B., C. & M. R. R., Cedar Rapids, Iowa.  
Sellers, Morris, late D. V. R. R., Pittsburgh, Pa.  
Setchell, J. H., L. M. R. R., Cincinnati.  
Sellers, L. H., M. C. R. R., Huntsville, Ala.  
Smith, W. T., P. & E. R. R., Erie, Pa.

Sedgley, J., Lake Shore, R. R., Cleveland, Ohio.  
Street, C. B., Pennsylvania R. R., Blairsville, Pa.  
Strong, W. M., N. Y. & H. R. R., New York.  
Studley, E., C. B. R. Co., Concord, N. H.  
Sanborn, A. J., St. L. V. & T. H. R. R., Terre Haute, Ind.  
Sprague, H. N., Pittsburgh, Pa.  
Tier, G. H., Toledo, Div. L. S. & M. S. R. R., Norwalk, O.  
Towne, L. N., H. & St. Jo. R. R., Hannibal, Missouri.

Thompson, C. A., L. I. R. R., Hunter's Point, L. I.  
Thompson, J., P. F. W. & C. R. R., Crestline, Ohio.  
Thompson, John, Eastern R. R., East Boston, Mass.  
Turrell, W. F., C. & P. R. R., Cleveland, Ohio.  
Towne, H. A., H. & St. Jo. R. R., Hannibal, Mo.  
Thompson, E., S. M. R. R., Hokah, Minn.  
Taylor, J. K., B. O. C. & N. R. R., Boston.  
Taylor, E., late North Missouri R. R.  
Thornton, Matthew, Macon & Brunswick R. R., Macon, Ga.

Templeton, Thomas G., P. R. R., Battle Creek, Mich.  
Van Vetchen, J. A., G. W. R. R., Meadville, Pa.  
Van Tuyl, A., Indianapolis, Ind.  
Wells, R. J., M. & I. R. R., Jeffersonville.  
Wright, N. A., G. W. R. R., Kent, Ohio.  
Whitney, H. A., E. & N. A. R. R., St. Johns, N. B.  
Wade, R. L., N. C. R. R. Company Shops, N. C.  
Wiggin, J. E., B. H. & E. R. R., Boston.  
Waite, F. A., B. & M. R. R., Boston.

Woodcock, W. P. G. & N. R. R., Philadelphia.  
White, J. L., E. & C. R. R., Evansville, Ind.  
Waddy, J. E., O. A. & M. R. R., Alexandria, Va.  
Walker, E. A., C. C. R. R., Hyannis, Mass.  
Williams, E. H., M. Baird & Co., Locomotive Builders, Philadelphia.  
Wooten, J. E., P. & R. R. R., Reading, Pa.  
Waugh, Lee H., K. P. R. R., Wyandotte, Kansas.  
Weaver, Daniel S., Eastern Kentucky R. R.  
Young, L. S., C. C. & I. R. R., Cleveland.  
Young, John, Erie & Pittsburgh R. R.

## ORDER OF BUSINESS.

1. Reading minutes of previous meeting.
2. Calling the roll of members.
3. Signing the constitution.
4. Report of Treasurer.
5. Report of committees appointed at previous meeting.
6. Election of officers.
7. Appointment of a committee to suggest subjects for consideration.
8. Appointment of miscellaneous committees on finance, printing, place for next annual meeting, &c.
9. Report of committee to suggest subjects for consideration.

10. Appointment of committees to report upon the subjects suggested for consideration.
11. Unfinished business.

Signed,

H. M. BRITTON,  
N. E. CHAPMAN,  
J. H. SETCHELL, } Committee.

## New Michigan Railroads.

From our State exchanges we condense the following items of railroad intelligence:

**The Air Line.**—A meeting of the stockholders of the Michigan Air Line Railroad was held at Pinckney a short time since to hear a further report concerning the leasing of the line to the Michigan Central. It appeared from the report presented that the road has been leased for 999 years, and is thus virtually turned over to the complete control of that company. The report also shows that a suit is now pending against the company, brought by Young & Co., the contractors, in which they claim \$250,000, and that a large number of other litigations are also pending. The committee evidently consider the outlook a bad one from the terms of their report, and it was simply accepted. It would appear that for building 120 miles of road the contractors received \$3,266,854.14 in various forms—stocks, bonds, etc. A large amount of stock subscriptions still remain uncollected. The committee reported that they did not despair of the road, but it must be confessed that the prospect of its becoming an independent concern again is not very good.

**Adrian & Detroit.**—Work is progressing on this line at several points, though a good deal of difficulty has been experienced in collecting subscriptions. The first installment of 20 per cent. was called for two months ago, but a large part of it still remains unpaid. The effort to secure the right of way is attended, too, with serious trouble, owners often asking prices that are deemed exorbitant. On the other hand, work is being done a mile from Bear Creek; on the Bailey farm towards the Quaker church; near the Tecumseh line, in the town of Macon and in Saline. The matter of grading is progressing quite satisfactorily, and five miles will be completed by December 1. The second installment of 20 per cent. will then be called for.

**Saginaw & St. Louis.**—At a meeting of the directors of the Saginaw Valley & St. Louis Railroad Company, held a few days since, the contractor, Mr. McDonald, reported that he had a force of 150 men at work on the road-bed and had four miles and a half graded, and some seven miles cleared for grading. The directors are seeking to collect five per cent. assessment, and this work seems to be attended with some difficulty. It appears that the original plan for constructing the Saginaw & St. Louis Railroad was to run it from East Saginaw through Saginaw City to St. Louis, and the East Saginaw stockholders, who took some \$30,000 of the stock, claim that they subscribed for it upon the express condition that the line should be so located, expecting that at East Saginaw it would connect with the Flint & Pere Marquette. Now, however, it appears that the new line has entered into some contract with the Jackson, Lansing & Saginaw Railroad, and proposes to make Saginaw City one of its termini, thus cutting off in a measure East Saginaw and the Flint & Pere Marquette line. The East Saginaw stockholders have, accordingly, held a meeting, at which they charged the managers of the Saginaw & St. Louis road with grossly bad faith towards them. They demanded an inspection of the books of the company, which appears to have been previously refused them, and the managers agreed to comply with the demand. Messrs. C. V. De Land, J. G. Owen, C. K. Robinson, C. W. Grant and Charles Wickes were appointed a committee of investigation. A resolution was introduced declaring that they would not pay any assessments on their stock until the original agreement was carried out, concerning which action was deferred until the Committee of Investigation should report.

**Big Rapids.**—The citizens of Big Rapids ask Mr. Joy to extend the Detroit & Lake Michigan from Howard city to their town, and they think the extension can be secured by grading the line. A committee, consisting of C. C. Fuller, J. O. Rose and John F. Brown, has therefore been appointed to confer with Mr. Joy and obtain from him a definite proposition regarding the matter. A line from Muskegon has also received some consideration, and the citizens of Big Rapids feel sure of obtaining one or the other.

**Line to Tuscola County.**—A project is on foot to build a line from the Flint & Pere Marquette Railroad from Bridgeport or Birch Run through Vassar, Watrousville, etc., to Caro, and thence to the lake shore. The officers of the Flint & Pere Marquette have recently passed over this projected line, and their report is now being anxiously awaited. The East Saginaw Enterprise heartily indorses this project, as does also the Caro Advertiser and Caro News. They state that the road will positively be built, and that the Flint & Pere Marquette Company have already contracted with A. S. Page, of Oswego, to construct a road from some point on their own line to his pine lands in Lapeer and Tuscola counties. The citizens of Caro are deeply interested in the road, and are working zealously to secure its construction.

**The Midland Railroad.**—This line is one that has been projected to run west from St. Clair, through or near Oxford to Holly or its vicinity. A thorough survey is being made in the vicinity of Oxford, and there is a rumor that this company will get possession of the franchises of the old Air Line. The engineers are now in the vicinity of Romeo.

**Detroit & Bay City.**—The Bay City Journal states on information that within a few weeks work will be commenced between Detroit and Vassar. It also surmises that whether the line shall go to East Saginaw or Bay City depends upon which place will give the most toward it. If the former will give \$25,000 more than the latter, the Journal believes that Mr. Joy will send it there. The committees appointed to solicit subscriptions have been at work vigorously, and it is stated by the Journal that all but \$5,000 or so of the \$400,000 required of the county is raised. The line will probably soon be put under con-



tract. The Saginaw *Enterprise* thinks that the cities of Saginaw stand as good a chance of receiving the terminus of the road as does Bay City. It urges that there are far better connections with other railroad lines than at Bay City, and that Saginaw would be preferable, as it is destined to become an important railroad center, with the roads it already has in operation, and with the Saginaw & St. Louis line now projected. The *Lapeer Democrat* states that a contract has been entered into between the company and H. H. Smith, the contractor of the Detroit & Lake Michigan Railroad, backed by Mr. Joy, for the construction of the road from Detroit to Vassar, a distance of 75 miles, as soon as \$4,000 per mile is pledged. Some of this amount is still wanting, but it is believed that the whole sum will soon be made up.

**Owosso & Big Rapids.**—The Alma contractors now manifest a determination to push their section of this road to an early completion, and the citizens of Ithaca are also manifesting an interest in the matter, and are subscribing. Some strife exists between the citizens of Salt River and those living in the vicinity of Summerton, regarding the road. The latter people claim that they can procure subscriptions of stock amounting to \$10,000 if the road shall be carried that way. To touch Salt River a divergence of two miles from the main line would be required. The citizens there are very wide-awake about the matter also, and the contest is apparently a brisk one.

**The Hudson & Jackson.**—A meeting of this organization was recently held at Hudson, Hon. Eugene Pringle in the chair. The report showed that \$2,000 had been received on five per cent. assessment, of which \$800 had been expended in making surveys. It was determined to employ persons to canvass for subscriptions and to have an investigation made as to the best route for the road. Resolutions were adopted declaring faith in the undertaking and the belief that it would prove a public benefit.

**The Northern Central.**—This line designs to run from Jonesville to Albion and thence further north. The grading is being completed between Jonesville and Homer, and it will soon be finished also between Homer and Albion. Bridge timber for three bridges is on its way to Homer. The managers have already run the line to within five miles of Eaton Rapids.

**Mansfield, Coldwater & Michigan.**—The ironing of this line is about to be commenced at Mansfield. An active force is at work between Tiffin and Mansfield, and the work is being pushed forward with great vigor. Ties are being shipped to the Mansfield end.

**Marshall & Coldwater.**—This line is also progressing favorably. The communities from Muir to Elm Hall have raised the amount apportioned to them, and on December 7 a meeting will be held to frame articles of association for extending the road northward from Muir by way of Hubbardston, Carson City and Elm Hall. Work will soon begin upon the bridges at Muir. Everything seems going finely except at Vermontville, where some sort of dead lock exists.

**Other Projected Routes.**—A branch road from Reed City to Manistee, along the banks of the Little Manistee River, is projected. It would penetrate a forest of pine timber estimated to contain 900,000,000 feet. It is estimated that the Little and Big Manistee have the material along their banks for 4,500,000,000 feet of lumber.

A line from Newaygo to Pentwater is proposed, the route being reported as an extremely favorable one, the greatest grade only 13 feet to the mile. Grading is soon to commence on the line of the Grand Rapids & Newaygo road between Newaygo and Casnovia.

Two lines are seeking to make a terminus at Frankfort, viz.: the Owosso & Big Rapids and a line to intersect the Grand Rapids & Indiana at Clam Lake, in Wexford County. The Grand Rapids & Newaygo road is also having a survey made with the view of extending their line to Hart.

A good deal of interest is felt at Palo in anticipation of a line running from Grand Rapids by way of Kiddleville, Palo and Carson City to St. Louis. Liberal subscriptions are being received.

Surveyors have been at work recently on the Michigan Midland Railroad west of Romeo.

Good progress is being made on the line from Montague to Pentwater, and construction trains are now running four or five miles north of Montague. Ties are needed, but a supply is expected soon, and it is thought that the line will be completed by January 1, 1872.—*Tribune*, Nov. 28.

#### Baltimore and its Southern Railroad Connections.

The *Baltimore Gazette* has given the following extended, though not very definite, description of the reported operations of Baltimore capitalists in Southern railroads:

We have from time to time alluded to the purchase or lease of Southern roads by parties in close connection with the Pennsylvania Central. For a time it was believed that these operations were being made for the benefit of that road. Some months ago we discovered that this organization, under which this Southern consolidation was being effected, was an independent one, and we have heretofore been restrained by prudential motives from speaking on the subject. Now that the system has attained proportions which make further secrecy unnecessary, we give to the public details which will be of unusual interest.

Some four years ago, the great body of the Southern railroads, being still in a more or less dilapidated condition from the wear and tear of an exhausting war, their stocks and mortgage bonds being in a very depressed condition, their means and credit being limited, and their co-operative organization not only incomplete, but checked by the antagonism of special interests and narrow views, a movement was inaugurated by Mr. W. T. Walters, of this city, which he believed would not only yield a large profit to himself and his associates on money invested, but benefit the city of Baltimore by adding greatly to its trade. It seemed, indeed, evident that a compact organization of the great lines of Southern intercommunication, under a system controlled by one head, kept in full working order, thoroughly equipped,

with regular and speedy passenger and freight trains running at the lowest paying figures, must necessarily improve the condition of the whole Southern country, and lead consequently to the development of this, its natural and most important market.

Mr. Walters has been joined in this enterprise by our fellow-townsmen, Messrs. Alex. Brown & Sons, General O'Donnell and Messrs. Thomas C. Jenkins, Horace Abbott, Thos. Kensett, Geo. Bartlett and B. F. Newcomer. Messrs. M. K. Jesup & Co., D. Willis James and Roosevelt & Son, of New York; Drexel & Co., P. A. & S. Small and Whitney & Sons, of Pennsylvania, and Daniel James, of Liverpool, are also associated with it. Over seven million dollars have already been expended in actual cash outlay, and up to the present time, by purchase of stock, a controlling majority in a number of most important lines of railroad, comprising in all 1,425 miles, has been secured. Besides this, control has been obtained, under lease, of 363 miles additional. These combinations already comprise complete lines from Richmond, via Danville and Charlotte to Atlanta; Richmond, via Weldon and Wilmington to Charleston and Augusta; and from Atlanta, via Knoxville to Bristol, from which a connection will, in all probability, be made with Danville by General Flournoy's road, which will be constructed.

Additional roads have been built, and all are, or are being put, in first-class working order and thoroughly equipped.

It will thus be seen that this new company now controls both the main lines south from Richmond, the North Carolina roads, the chief roads of South Carolina, two main roads in Georgia, and the important lines of East Tennessee. These combined Southern lines will have direct communication north of Richmond with Washington, Baltimore, Philadelphia and New York, both through the present lines and by others to be built in friendly alliance with the new organization.

The programme will be complete within two years, when facilities for freight traffic and passenger communication will be afforded the entire South that will not only be simply unrivalled, but cannot be provided by any competing interest at less than double the outlay of this company, as control of these roads have been obtained at an average cost of about 50 cents in the dollar on the original cost in times of gold currency and cheap labor. Baltimore will have complete communication with the whole South by lines of railroads 200 miles nearer than New York. Atlanta will be placed in direct communication with this city by a route 100 miles shorter than any existing one, and passenger trains will traverse the entire distance, 650 miles, in less than twenty-four hours, upon the final completion of the Charlotte and Atlanta link, to be finished within eight months. It follows, as a matter of course, that the enterprise of this new organization cannot stop here. From Chattanooga and Atlanta it is but a railroad step to New Orleans and Mobile.

The great benefit to be derived by the South from a thorough organization of a complete system of roads under one management, fully equipped, and free from the petty annoyances of local interference, must be apparent to every one. Such a system must tend to develop immensely those great home interests, agriculture and manufactures, upon which the very vitality, indeed we may almost say existence, of the South now depends. To Baltimore the advantages of economical transportation and cheap travel must be very great. We shall thus be thrown into more intimate business and personal communication with those with whom we are allied by common sympathy, and with whom, we have always contended, our most important commercial interests are inseparably united. There is no risk in predicting that, in the staple article of cotton alone, the receipts in this city for the first year after the final completion of communication with the leading business centres of the South, will be increased fully 300,000 bales. There will not only be a vast increase of receipts from the South, but there must necessarily be an enormous addition to the supplies shipped to the South. Baltimore will not only become a large exporting mart, but its foreign importations must of necessity grow very largely.

For prudential reasons we forbear for the present giving further facts in regard to the negotiations now in progress, which will add greatly to the magnitude of this enterprise. We will only add that the organization which controls these operations is in no way connected with the Pennsylvania Central. It is necessarily a most dangerous competitor for the Baltimore & Ohio road, its prime movers having had the sagacity and the tact to obtain quietly most important leading communications, from which our State road is now absolutely cut off. Baltimore is at least to be congratulated upon the fact that, no matter what else may be said of it, it has grown great enough to sustain more than two considerable railroad enterprises.

#### THE SCRAP HEAP.

##### The Mauch Chunk "Switch Back."

The *American Manufacturer and Trade of the West* says: "A statement in the *Iron Age* claims that the 'Switch Back' of the Lehigh Coal and Navigation Company was built in 1827. We beg leave to correct our able contemporary. This, the greatest engineering achievement of any country, was completed fully and in successful operation in 1847. For twenty years before but the one track was used, the empty coal cars being returned from the shipping port at Mauch Chunk to the company's mines, nine miles, by horses and mules, which were driven tandem on the sides of the trains. These animals were carried back to Mauch Chunk in trains of cars constructed for such use—and every person familiar with the region in its early history will remember the picturesque and striking appearance presented by these 'mule cars' on their passage, laden with their long-eared freight, on the down grade.

"But the great 'switch back' is soon to fade out of existence, and the novelty of climbing up mountains by

means of four planes, which aggregate 1,800 feet in height, and traveling over twenty-five miles of gravity road, at a rate sometimes of a mile in two minutes, will be no more after this season, as the coal company have opened a new road to their mines through the Nesquehoning Valley, and will suspend operations on the old one.

"This old road, by the by, is three-foot gauge, and the first genuine railroad built in the United States, when one or two mere tramways are not considered. It was completed about the year 1825, under the direction of two Quaker gentlemen from Philadelphia—Josiah White and Erskine Hazard—who had large proprietary interests in the coal lands, and were the principal managers of the affairs of the Lehigh Coal and Navigation Company, the oldest coal operating company in the country, and now the most powerful."

##### Prices of Rails in November.

Bigelow & Johnston, of No. 48 Pine street, New York, report as follows prices current for rails during the month ending November 30, 1871:

	Gold.	Currency.	Import, tons.
<b>New rails:</b>			
English.....	\$57½ @ 58		5,551
American.....		\$70 @ 71	
Total import this month			5,551
Import since January 1..			194,572
Total to date.....			200,123
Same time, 1870.....			142,561
<b>Old rails:</b>			
Double heads.....	39 @ 39½		
T or flange.....	38 @ 38½		
U or bridge.....	Nominal		5,226
Total import this month			5,226
Import since January 1..			51,791
Total to date.....			57,017
Same time, 1870.....			50,697

##### New Car Works.

It is reported that Mr. J. B. Sutherland, long Master Car Builder of the Michigan Central Railroad, and recognized as one of the most complete masters of his business, has purchased the old car shops of the Jackson, Lansing & Saginaw Railroad, in Jackson, Mich., and is fitting them up as a manufactory of freight cars.

Works have also been established recently in London, Ontario, near the junction of the Grand Trunk and Great Western roads, which are to have a capacity for turning out three cars daily.

The new car works of the Great Western Railway at London, says the *London Free Press*, are being built on a plot of twelve acres of ground, just outside the city. They will be placed under the superintendence of Mr. Thomas Muir, brother of the Superintendent of the Great Western. There will be four extensive departments, with dimensions as follows: 1st, the machine and blacksmith shop, 50x185 feet; 2nd, the wood machine shop, 85x120 feet; 3d, erecting and paint shop, 65x235 feet; 4th, engine house, 20x40 feet. The latter will be built of brick; but the shops in general of substantial and permanent framework. When ready to commence operations, the works will employ between three and four hundred men.

##### Omaha Bridge.

It is reported that the three spans nearest the Nebraska shore are completed, and work upon the fourth is rapidly progressing. There will be eleven in all, each of them 250 feet long, and it is expected that before spring they will all be in place. On the Nebraska side the filling between the abutment and bluff is being made. On this side the grade requires ten feet more to bring it up to the proper height, and for this nearly a million more cubic yards of earth are needed.

##### A Locomotive Explosion.

A telegram from Hawley, Pa., dated December 3, says: "The boiler of engine No. 235, belonging to the Erie Railway Company, exploded here about 4 o'clock this morning. Fortunately the engineer and fireman were not on the engine at the time, and no one was injured. The engine-house was badly wrecked. Large pieces of the boiler were thrown hundreds of feet in every direction, crashing through adjoining buildings and into cars standing near. One huge piece of iron was thrown 100 feet in the air and came down through the roof of the engine-house, through the floor and embedded itself deep into the ground."

##### Cast-steel Brake Blocks.

Writing from Berlin, a correspondent of *Engineering* says:

"Metal brake blocks, consisting of a combination of cast iron and cast steel, have come into considerable use upon German lines, with results so favorable that they will probably supersede almost entirely brake blocks of wood. They are made of charcoal iron mixed with cast-steel turnings, very carefully selected and tested. It is found that if the blocks are too hard they fracture easily, and if too soft, of course, the wear is excessive. The duration is found to be considerable, and the cost less than that of wooden blocks, while the most important feature is the preservation of the tires and of the permanent way. Experiment lasting through two years has shown the wear upon the tires to be extremely equal, and much less than that caused by wooden blocks; the wheels also become less heated. The reduced effect of iron blocks, as compared with those of wood, is compensated by increasing their weight."

##### Central Car and Manufacturing Co.

This is the title of the corporation which has recently commenced constructing cars at shops in Jackson, Mich. It turned out its first cars—a lot of ten for the Chicago & Michigan Lake Shore road—on the 4th inst. It has orders for 100 from that company. It commences with a force of 50 men, which is to be increased immediately.





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## Editorial Announcements.

**Address.**—The RAILROAD GAZETTE will be printed for the present in New York; our printing house in Chicago having been destroyed. All communications, therefore, whether editorial or business, should be directed to the New York office. The proprietor will receive subscriptions and advertisements at his office in Chicago, Nos. 63 and 65 South Canal street, but letters should be addressed to New York.

**Correspondence.**—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

**Articles.**—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

**Inventions.**—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## THE ILLINOIS FREIGHT LAW.

While the last Illinois Legislature passed elaborate and positively restrictive laws concerning the charges for carrying passengers on railroads, limiting the rate of fare per mile according to the amount of gross receipts per mile of road, only general provisions concerning the transportation of freight were enacted, and of these, we believe, only one concerned the charges for transportation. This was a law forbidding a higher rate for transporting freight a certain distance than is charged for transporting similar freight a greater distance over the same road. This was designed to prevent the discriminations, often very great, made against non-competing points. It was originally proposed, we believe, by the Massachusetts Railroad Commissioners, and has been more generally approved, perhaps, than any other restrictive measure proposed up to this time. Applying it to the great routes of the country, it would prevent greater charges from Chicago to Philadelphia than from Chicago to New York, but would not prevent as great rates to one as to the other.

Wherever competition exists there is a constant tendency to reduce rates to the competing points, so much so that quite commonly the business to and from such points, though perhaps great in bulk and in gross receipts, is almost altogether unproductive in net receipts, and this not merely because the rates to such places are reduced, but because unusual efforts attended with unusual expenses are made to secure the traffic.

Now the legislation referred to was probably intended to extend the effect of the competition at a junction or crossing to other stations, and it is possible that its enforcement might to a certain extent effect this; though it is quite as like that, for some time at least, the result would be the discontinuance of the competition at the crossings instead of its extension to other stations.

And this, we claim, is just what is desirable—at least the discontinuance at every station of any competition which causes a reduction of rates to or below the cost of transportation or very much

below the rates to other stations. Usually this is considered as the great good fortune of the competing point, for which the railroad company alone pays. But it cannot be too clearly understood that it is not the company but the other stations on the road which pay for this privilege of the favored towns. The latter have to fear the general extension of competition to all stations as much as the former desire it. Whenever rates shall be reduced at the present non-competing points, they will be increased at the present competing points. Companies will reduce rates almost without limit in competing for business with a rival (railroad officers not unfrequently permitting their feelings to affect their manner of doing business for their company to a greater extent than if they were managing their own business), so long as they can make up their losses or lack of profits by higher charges at other places; but they will not long pursue a policy which will permanently and seriously reduce their receipts.

The Illinois Board of Railroad and Warehouse Commissioners has recently commenced suit in the Circuit Court at Bloomington, Ill., against the Chicago & Alton Company for violation of the law in question. In their petition they recite several instances in which that company has charged and received \$5.65 per thousand feet for transporting lumber from Chicago to Lexington, 110 miles, while at the same time it carried lumber from Chicago to Bloomington, 126 miles, for \$5 per thousand. According to the provisions of the Illinois law the penalty for the willful violation of the law is the forfeiture of the franchises of the offending corporation, and the Commissioners in their petition ask that the Chicago & Alton Company be required to show cause why leave should not be granted to file an information in behalf of the people of the State of Illinois in the nature of a *quo warranto* against that company for "usurping and unlawfully holding and exercising corporate powers and franchises."

This case is to come before the court during the present month, if not postponed. Whatever the decision may be, doubtless there will be an appeal to the Supreme Court of the State, and finally to the Supreme Court of the United States, and the decisions of these courts will be of great importance, as settling to some extent the degree and manner in which railroad companies, whose charters have been granted without restrictions, as in Illinois, may be restricted or directed in their operations by the Legislature of the State. The Commissioners have chosen well in selecting a point to contest. The regulations concerning passenger fares have been, we believe, violated constantly by all the companies in the State, but the impression is very strong that this law cannot be sustained in the courts, and that it is not worth fighting for. The belief in the validity and equity of the freight law is much more general, and the Commissioners, in prosecuting the case to a conclusion, will doubtless have the popular support and approval. The company, of course, is perfectly confident of a decision in its favor, having had from the first the very best legal advice, without which it would not have ventured to disregard the law.

## THE NEXT MEETING OF THE MASTER MECHANICS' ASSOCIATION.

In the RAILROAD GAZETTE of last week we published a list of the subjects for discussion at the next meeting of the Master Mechanics' Association, and also the circulars of inquiry from some of the committees. Perhaps nothing else would give so clear an idea of the field for usefulness which this Association is cultivating than a glance over the list of subjects for investigation, and the questions which the different committees have prepared and presented to their associates. This plan of procuring information has about it a practical directness which is characteristic of the members of the Association, and which, if wisely employed, must result in the accumulation of a fund of information which will be exceedingly valuable. Of course, any plan or organization, no matter how good it may be, if not supplemented with individual exertion, will not be successful. In order that the Association may fulfill to the fullest extent the objects of its organization, each member must perform his part of the duties and obligations incumbent upon him. At the last the and previous meeting, much complaint was made by the Secretary and others of the indifference of members to their duties to the society. Only a small proportion of them made any reply to the circular sent out, and some of the committees made no report at all. A duty which is laid upon us in virtue of our being but a small portion of a great whole is not felt to be nearly so obligatory as one which appeals to us individually; and so members are very apt to suppose that their remissness is a matter of no importance and that their neglect will be unnoticed. If we can induce such to exercise a little private reflection on their own shortcomings, per-

haps we will not be writing in vain or without accomplishing some good. If all the members should neglect their duties, the Association might as well disband; and if no notice is taken of the committees' inquiries, there is no use in preparing the questions. We think it is probable that the neglect of those who are so silent arises chiefly from a habit of leaving undone things which they ought to do, just as they allow their accounts to fall into disorder or stay away from church. If we were appointed the Managing Mogul, or the Executive Mechanician of some line of road—say from here to the North Pole, or to the interior of Yucatan—and were in search of a Master Mechanic to take charge of the machinery on such a line, we would know of no surer way of getting a good man than to call on the Secretary of the Master Mechanics' Association and request the privilege of examining and comparing the replies to the questions of the committees. From the dates of their receipt and their general character we think it would be possible to make a good selection of a man for the vacant place.

There is another motive, too, which is perhaps more selfish, but which is worthy of consideration by all to whom the circulars are addressed, and especially by the younger men: we mean the advantage which would accrue to themselves as the result of preparing suitable answers to the questions. The old adage, "that any fool can ask a question, but only a wise man can answer well," might be quoted without reference to the committees, but has much significance for those who make reply to their inquiries. On many subjects with which we are familiar we may yet not have very clearly defined opinions. Take, for example, the question, "What is the highest mileage you have known a half-round brass to run before it becomes loose?" and we doubt whether one master mechanic in five could answer it correctly without investigation. Or, let a man without prejudice ponder over the last question of the narrow-gauge committee, and undertake to write out what he thinks, and he will find that somehow his thoughts will be more clear when he is done than when he commenced.

It is said that if you want to understand a subject, write a book about it. Replying to the inquiries of the committees will have a similar effect. Most of us have occasion for surprise and humiliation at our ignorance when we are interrogated about the things which come under our daily observation; and only a little disinterested search after the truth will reveal to us how exceedingly narrow is the range of ordinary observation, our own included. Lawyers tell us that one of the rarest persons to be found is a witness who can testify accurately to what he saw, and who saw all there was to be seen. If no other good should result from preparing answers to the inquiries of the committees, that of revealing to those who prepare them how very little they know on the subjects would be abundant compensation. Some months ago we had occasion to determine upon the amount of time which is lost by bringing an express train with the ordinary hand brakes to a full stop. Those who are curious will be surprised at the diversity of opinion which such an inquiry will elicit, and if any of our readers will try to decide the matter, they will know what we mean when we say that they will learn a great deal if they take the trouble to prepare intelligent answers to the questions to which we have referred.

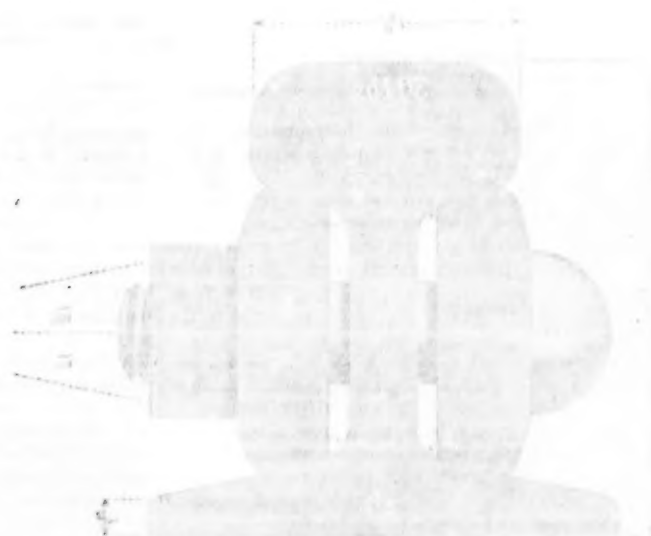
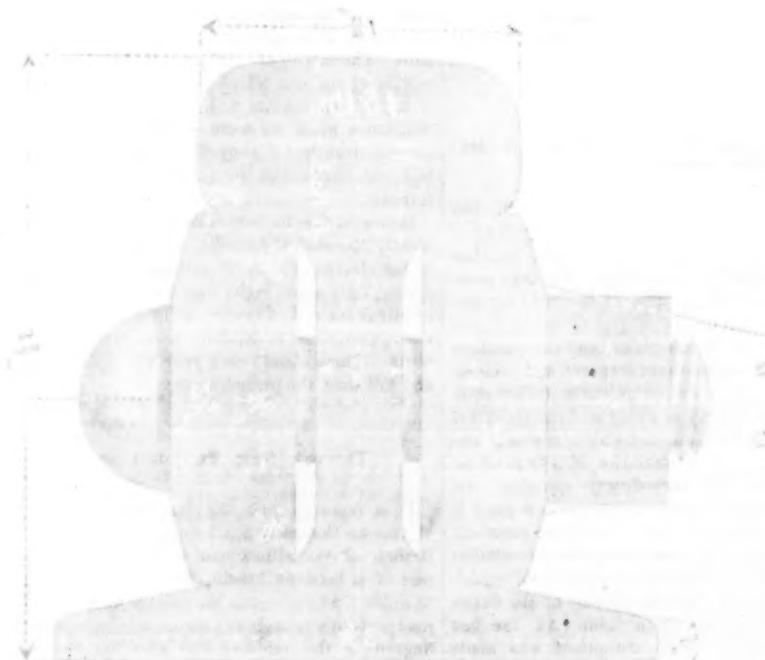
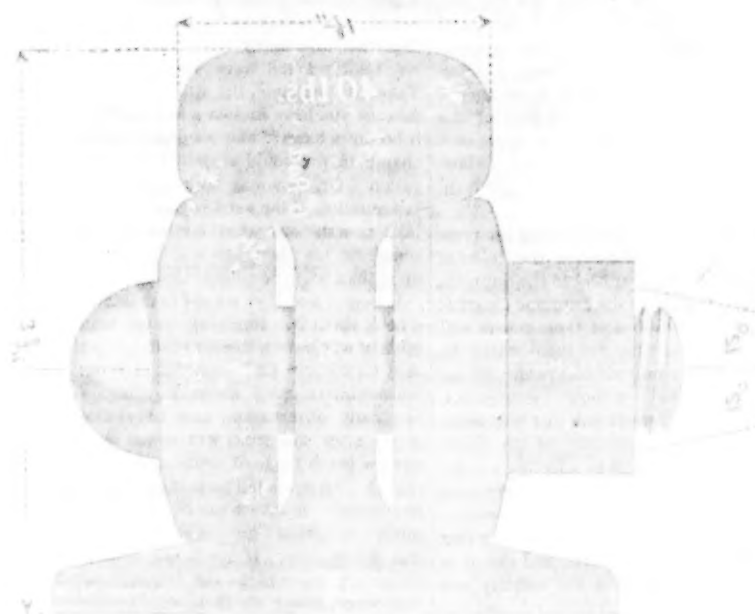
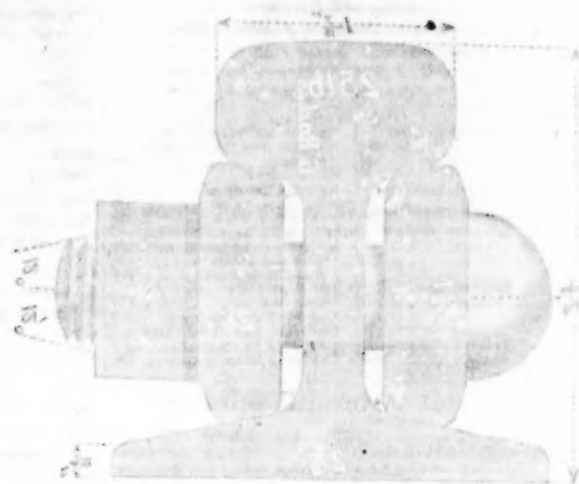
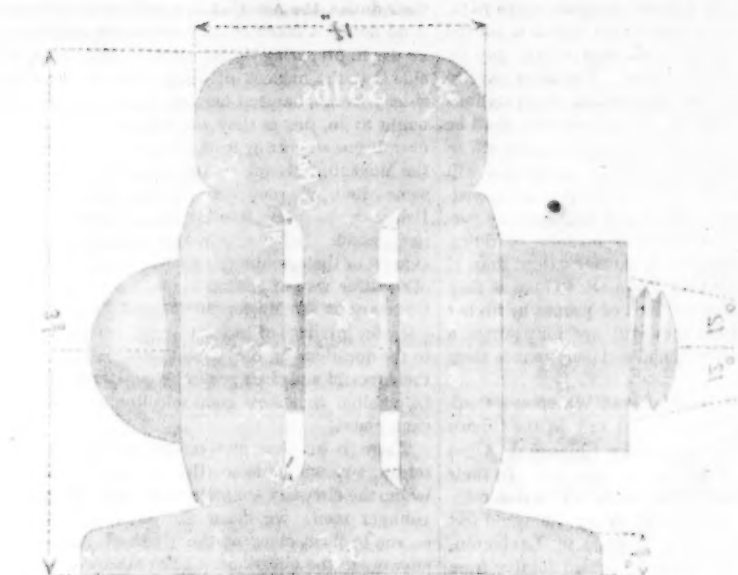
It should also be remembered by all the members of the Master Mechanics' Association that this year, on account of the change of time of meeting from the fall to the spring, only about eight months intervene between the meetings instead of twelve, so that much more than ordinary promptness is required in order to prepare the reports. These should each year be made more complete and full than the preceding ones.

## Through from St. Louis to St. Paul.

It is reported that the Burlington, Cedar Rapids & Minnesota Company has leased the Austin & Mason City Branch of the Milwaukee & St. Paul Railway, or that part of it between Austin, Minn., and Plymouth, Iowa, 32 miles. At Plymouth the extension of the Burlington road joins this branch at a distance of 229 miles from Burlington; so the company will soon be operating a line 261 miles long.

A regular route is to be opened between St. Louis and St. Paul, directly in connection with this road. It will consist of the Milwaukee & St. Paul Railway from St. Paul to Austin, 104 miles; the Burlington, Cedar Rapids & Minnesota from Austin to Burlington, 261 miles; the Toledo, Peoria & Warsaw from Burlington to Bushnell, Ill., 42 miles; the Rockford, Rock Island & St. Louis Railroad from Bushnell to St. Louis, 155 miles. This makes the total distance between St. Louis and St. Paul by this route 562 miles. This is 121 miles greater than the distance to





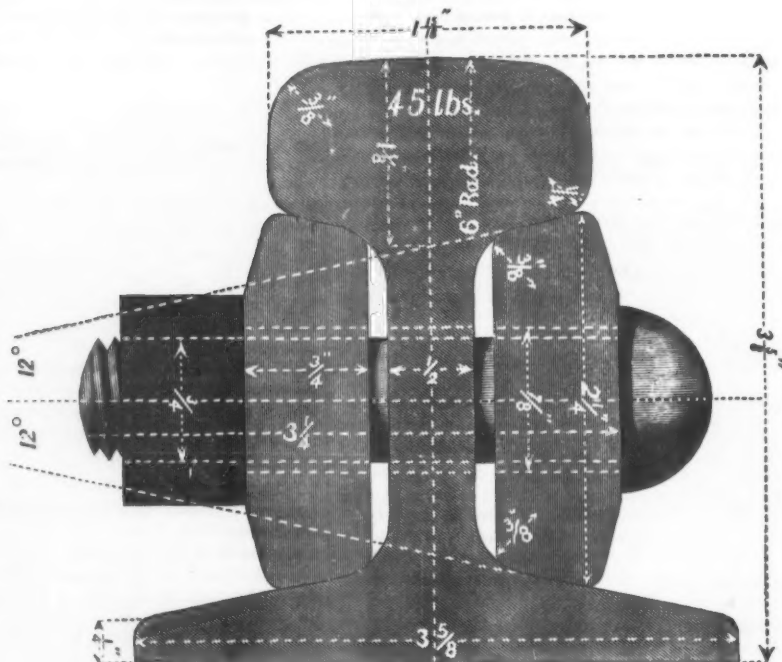
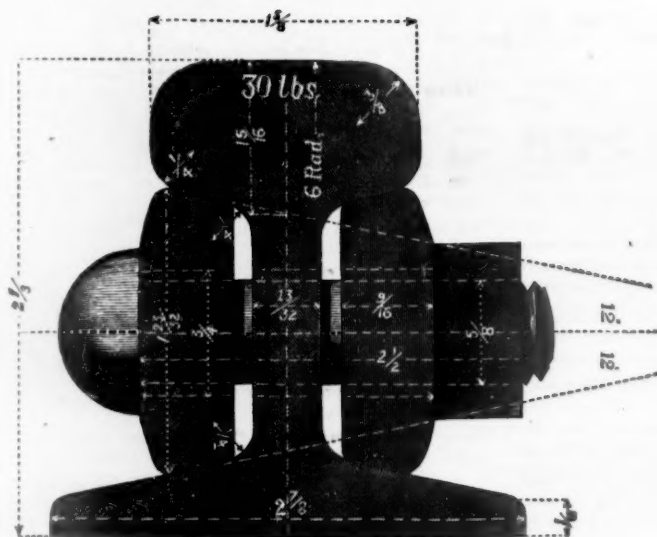
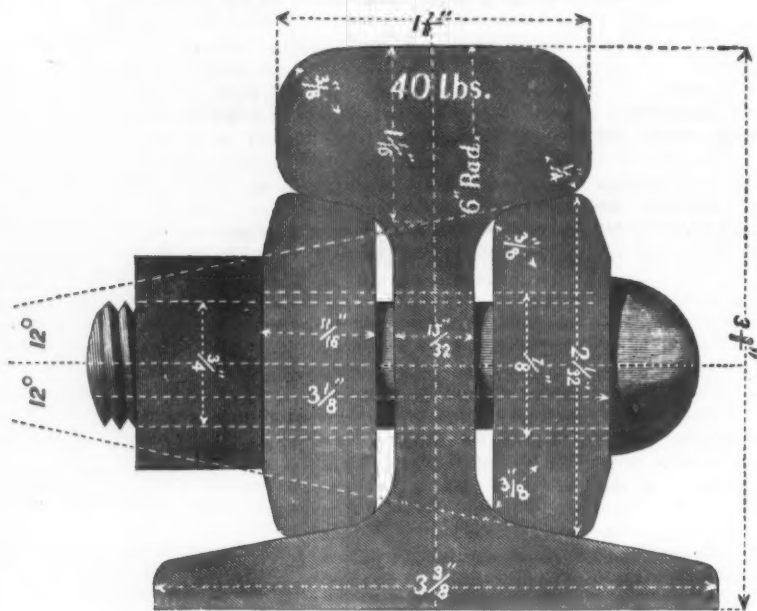
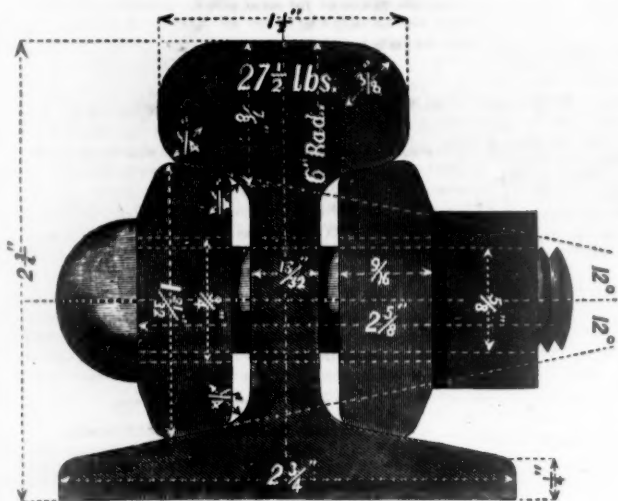
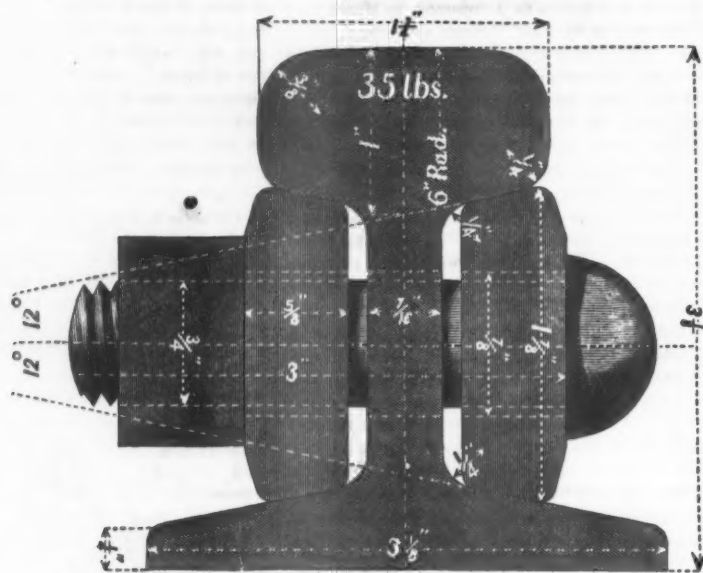
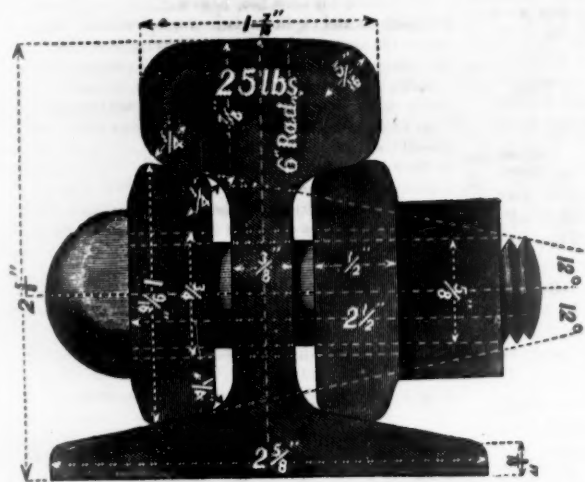
# STANDARD SECTIONS OF LIGHT RAILS:

DESIGNED FOR

Heyerdahl, Schönberg & Co., 31 Pine St., New York.

By M. N. FORNEY, Mechanical Engineer.





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Chicago and 156 miles than the distance to Milwaukee from St. Paul.

When the Iowa Central was completed to Mason City and the Milwaukee & St. Paul's branch road from Austin to the same place, it was expected that through trains would run regularly through between St. Louis and St. Paul, using the North Missouri road from Ottumwa; but the arrangements were never completed, there being apparently some irreconcilable differences between the different companies concerned. That route would be somewhat longer than the one *via* Burlington. There are intimate relations between St. Louis and St. Paul, and the other Minnesota river towns, and a considerable exchange of business, so long as the Mississippi is open, which is cut off short when it is closed, the railroad routes heretofore necessitating either many changes from road to road or a considerable circuit, and, indeed, the most popular winter route between the two cities has been that by way of Chicago, which is 720 miles long. By the new route, it is said, trains will run with close connections and some cars will be run through without change, very much improving the connections between the two cities.

It requires the co-operation of four distinct companies to operate this line, but the cars will run over the track of no less than six different lines, as the Toledo, Peoria & Warsaw uses eight or ten miles of the Chicago, Burlington & Quincy's track in entering Burlington, and the Rockford, Rock Island & St. Louis uses the track of the St. Louis, Alton, Terre Haute & Indianapolis road between Alton and St. Louis.

#### Chicago Meat.

The Dubuque *Telegraph* has a plan for supplying the large cities of the East with cheap meat, which is certainly very simple, but hardly remarkable for novelty. It would have dressed hogs bought in Dubuque, where at that time they were sold for \$4 per hundred; have the Pennsylvania Railroad Company (which has no connection with Dubuque) ship the hogs for \$1 per hundred, and let the New Yorkers buy them whole for about \$5 50 per hundred.

Now we will not go to Dubuque for our meat, lest we might exhaust the supply; but at the nearest great stock market, Chicago, this week the dressed hogs were quoted at \$4 80. (The price has advanced since the *Telegraph* wrote.) The freight to New York is 75 cents per hundred; and at this present writing the quotations in New York are \$5.75 to \$5.88 "for Western." From this it would appear that the *Tel. graph's* plan is in operation, as indeed it has been for many years. The people of Dubuque can at any time load a "Blue Line" car with dressed hogs—or any other freight—and dispatch it through to New York without transfer and on time. It is true that it would not go over the Pennsylvania Railroad, as Dubuque does not happen to be on one of its lines, but that we suppose is not indispensable to make the meat cheap. A very large business in pork shipments from interior points has been going on for many years. Aurora, Ill., has done a very large trade, chiefly with Boston, in dressed hogs and in poultry, shipping in through cars.

As to the city people buying whole carcasses at the lowest wholesale rates, it is true that the *Telegraph* makes out a good case in favor of the cheapness of such a policy; but as they have since time immemorial refused to do so, but have insisted on calling in the services of the commission merchant, the packer and the market man, some satisfied only with tenderloin and some only with sweet breads, we fear that we must even leave them to eat dear meat.

#### Railroad Earnings.

We copy from the New York *Bulletin* the following tables of earnings of fourteen railroads of the United States, for the month of November and eleven months of 1871, including all or nearly all those roads which report their earnings regularly. We have added a column showing the amounts of increase or decrease:

GROSS EARNINGS FOR NOVEMBER.			
	1871.	1870.	Increase or Decrease.
Chicago & Alton.....	\$463,036	\$411,197	Inc. \$51,839
Central Pacific.....	898,892	777,513	" 121,379
Cleve., Col., Cin. & Ind.....	340,625	323,311	" 17,314
Illinois Central.....	719,969	811,707	Dec. 91,738
Lake Shore & Mich. South.....	1,529,435	1,255,072	Inc. 274,363
Marietta & Cincinnati.....	172,567	144,023	" 28,544
Milwaukee & St. Paul.....	644,625	791,014	Dec. 146,389
Pacific of Missouri.....	*325,900	331,490	" 5,590
St. Louis, Alton & Terre Haute.....	*152,515	152,913	" 398
St. Louis & Iron Mountain.....	154,427	121,795	Inc. 32,632
Toledo, Wabash & Western.....	531,080	425,687	" 105,393
Union Pacific.....	723,000	570,000	" 153,000
Michigan Central.....	*533,590	453,873	" 79,717
Western Union.....	70,080	66,616	" 3,464
Total.....	\$7,062,681	\$6,666,212	
Increase.....	\$396,469		

\* Estimated for fourth week 1871.

It will be seen that the increase in earnings for the month, which was generally favorable for traffic, was just about 6 per cent., which is probably considerably

more than the increase in mileage. Only four of the fourteen roads show a decrease in earnings; that of the Illinois Central is about 11 per cent.; of the Milwaukee & St. Paul, 18½ per cent.; that of the Missouri Pacific only 2 per cent., while that of the St. Louis, Alton & Terre Haute is only about ¼ of 1 per cent. The largest increases are those of the Central Pacific, 15 per cent.; Toledo, Wabash & Western, nearly 25 per cent.; Union Pacific, 26 per cent.; Michigan Central, 17½ per cent.; St. Louis & Iron Mountain, 26 per cent.; Marietta & Cincinnati, 20 per cent.

#### GROSS EARNINGS FROM JANUARY 1 TO DECEMBER 1.

	1871.	1870.	Increase or Decrease.
Chicago & Alton.....	\$4,876,147	\$4,445,135	Inc. \$431,012
Central Pacific.....	8,796,341	7,411,425	" 1,384,916
Cleve., Col., Cin. & Ind.....	3,490,859	3,013,141	" 477,718
Illinois Central.....	7,751,755	7,986,301	Dec. 234,546
Lake Shore & Mich. S.....	13,454,366	12,239,934	Inc. 1,214,431
Marietta & Cincinnati.....	1,520,894	1,277,493	" 243,401
Milwaukee & St. Paul.....	6,317,430	6,891,302	Dec. 573,872
Pacific of Missouri.....	*3,298,408	3,265,982	Inc. 32,426
St. Louis, Alton & T. H.....	*1,692,813	1,564,437	" 128,376
St. Louis & Iron Mt.....	1,475,098	1,228,461	" 246,637
Toledo, Wabash & W.....	5,220,027	4,029,836	" 1,190,191
Union Pacific.....	6,936,578	7,123,272	Dec. 186,694
Michigan Central.....	*5,378,620	4,399,210	Inc. 979,410
Western Union.....	780,861	713,507	" 67,354
Total fourteen companies.....	\$70,891,187	\$65,589,337	
Increase.....	5,301,850		

\* Estimated for fourth week of November, 1871.

The increase for this period is considerably greater in proportion than for the month of November, being a little more than 8 per cent., and that without any considerable increase in mileage, though the Toledo, Wabash & Western, the Michigan Central and the St. Louis & Iron Mountain have this year been working advantageously important branches which the previous year they had only begun to develop.

The percentages or increase of the companies for this period are as follows: Chicago & Alton, 9½ per cent.; Central Pacific, 18½ per cent.; Cleveland, Columbus, Cincinnati & Indianapolis, 15½ per cent.; Lake Shore & Michigan Southern, very nearly 10 per cent.; Marietta & Cincinnati, 19; Missouri Pacific, 1 per cent.; St. Louis, Alton, Terre Haute & Indianapolis, 8½; St. Louis & Iron Mountain, 20; Toledo, Wabash & Western, 29½; Michigan Central, 22½; Western Union, 9½.

The percentages of decrease are: Illinois Central, 3 (very nearly); Milwaukee & St. Paul, 9½; Union Pacific, 2½.

Altogether the returns are quite satisfactory, the more so as some of the roads have met this year for the first the competition of new lines.

#### NEW PUBLICATIONS.

*The Traveler's Official Railway Guide*, the December number of which is before us, is now publishing an index to railroad stations, which gives an alphabetical list of more than 11,500 stations, and with each the name of the railroad or railroads on which it is situated. This table fills sixty of the long and closely printed columns of the *Official Guide*. It is prefixed by an index of roads which are now operated by companies of another name, so that he who looks up a town and finds it, by the list, on the Pittsburgh, Cincinnati & St. Louis Railway when he knew it to be only on the Chicago & Great Eastern, may turn back to this table and find that the latter has been swallowed by the former. This list, however, is not quite complete and might be extended to advantage. The index of stations has this advantage over lists published in books annually, in that it is published monthly, and that its publishers have the completest information of the opening of new lines and new stations, and are thus able to keep it up with the times.

The growth of the *Guide* is indicative of the growth of American railroads. This December number has the time tables of 410 railroad corporations, while the November number had but the even 400. Ten railroads per month is a pretty good rate of growth.

This new index of stations very much adds to the value of the *Guide*, and must make it very convenient to shippers, who often have occasion to look up the name of a town on some new railroad and are not able to find it in any of the annual (and very useful) shipping guides.

*The Workman's Manual of Engineering Drawing*. By John Maxton, Engineer. (London, Lockwood & Co., 1871.)

The author of this book in his preface says: "The object of it is to enable the working engineer to instruct himself in an important branch of his business." After reading this statement and examining the book, we feel disposed to regret that the preface was written and such an announcement made; because if the book was "designed especially for this purpose," it fulfills the design only indifferently well, while it does other things very well indeed.

No draftsman can read it without learning at a glance that the author has had a great deal of experience in the subject he is writing about, and after finishing it the matter of surprise is, how he could know so much and yet teach it so ineffectually. The book is full of useful hints relating to practical details, which nearly every student without an instructor learns only by long and often very discouraging experience. The chapters on drawing instruments and materials, inking in drawings, shading and coloring, are full of the most useful technical information, and young and even experienced draftsmen will find it a perfect mine of knowledge of this kind. We think

very few could read the book carefully without being obliged to admit that they had learned much that was new and would be valuable to them; and to those who are comparatively inexperienced in their craft the book is invaluable, and Mr. Maxton has done to all such a service and communicated information which cannot be found anywhere else.

The fault of his book lies, however, in a sort of want of consecutiveness and explicitness in its instruction. Take, for example, the opening chapters on instruments and materials. We can imagine the confusion with which a young and enthusiastic "working engineer" about to instruct himself in drawing would finish these chapters. He very probably would do exactly what such as he are prone to, and against which the author should have taken pains to guard his readers, that is, rush to an instrument dealer's and buy a quantity of unnecessary and expensive instruments. Any one with some experience and knowledge can discriminate about the suggestions of the writer, many of which are excellent in their way; but the young beginner would quite likely be confused. In fact, these chapters, taken in connection with the elaborate advertisement in the back part of the book of a dealer in drawing instruments, suggest the suspicion that the book may have been written in the interest of the latter.

The chapters which succeed those on materials have the title of "Hints on Geometry," and begin with the elementary definitions and end with problems in conic sections. The student, who is usually very eager to draw some object, must wade through many, to him, uninteresting problems before any information which he can apply practically is given. These are succeeded by several chapters on "Drawing from a Copy" and "Drawing from Models and Large Machinery." It will be found that there has not been a word explanatory of the theory of ordinary projections, and we can readily imagine that the student would be utterly unable to make two views of an ordinary bolt with a hexagonal head, when he would be confronted with the problem of "describing the hyperbolic oval," or be expected to comprehend one of the most difficult problems which a draftsman can be called upon to solve—that of drawing a pair of bevel wheels in oblique projection. All through the book some of the most perplexing problems are presented before the simplest principles are explained. The chapter on the projection of shadows precedes that which explains the simple details of shading and coloring, and the student is expected to learn how "to project the shadow of an elongated sphere on a plane parallel to its axis" before he has learned how to represent a piece of wood in elevation or section. Now the former are the refinements of graphic art and very rarely called into requisition. The knowledge which "working engineers" need most is that which will enable them to make working drawings. Ordinarily they have little time or thought which they can spare for studies which do not have a directly practical bearing.

For young draftsmen with some knowledge of drawing Mr. Maxton's book contains a great deal of useful information, and will amply repay them for its cost, which is \$1 80. It can be procured of D. Van Nostrand, No. 23 Murray street, New York.

#### Standard Sections of Light Rails.

The building of cheap railroads has created a demand for light rails, which, of course, should be so proportioned as to give the maximum amount of strength, with the minimum weight of material. The firm of Heyerdahl, Schönberg & Co., of No. 31 Pine street, New York, some time ago applied to Mr. M. N. Forney to furnish them with designs for light sections which would range in weight from 25 to 45 pounds per yard. At the time this application was made Mr. Sandberg's standard sections embraced no lighter patterns than 45 pounds. Inasmuch as his system for heavier rails seemed to be the best in use, it was adopted as the basis, and the light sections, of which we give illustrations herewith, were developed from it. Since our engravings were made, we have received from Mr. Sandberg a lithograph of sections for rails of 20, 25, 30, 35, 40 and 45 pounds per yard. They differ somewhat from those designed for Messrs. Heyerdahl, Schönberg & Co., but as we expect soon to publish engravings of Mr. Sandberg's sections, our readers will be able to compare them with those illustrated this week.

It will be seen that all the fish-plates of these are reversible. The base and height are equal in each section, and the angle of the under side of the head and top of base is 12 degrees in all of them. It was found that in order to make this angle 15 degrees—that adopted in the system referred to—either it was requisite to put more material in the base than was necessary for strength, or else the outer edges of the bases—if the latter were made equal to the height—must be made thinner than they could be rolled. The angle was therefore made 12 degrees instead of 15 degrees.

It will also be observed that the sides of the heads of the rails are flat instead of convex. If any one will observe the rails on a sharp curve, he will see that the flanges of the wheels invariably cut the rails away to that form. It was therefore thought best to make them of that shape when rolled.

—The Grand Trunk Railway Company has been indicted by the grand jury of the Supreme Court at Lancaster, N. H., for making unequal freight charges. The indictment is a novelty in legal proceedings, and the questions raised upon it excite much interest.



## Chicago Railroad News.

## Illinois Central.

This company has got the roof on its large new engine house at the Weldon shops in the city. The passenger depot at the foot of Lake street will be ready for use on the first day of January next.

It has been a matter of surprise to everybody that the great Illinois Central Elevator "B" did not fall a victim to the flames in the great fire. Several of the doors of the immense structure are charred and the side of the building, from top to bottom, is more or less singed. It is impossible to explain how it was saved, except that a fire engine was taken possession of by Mr. J. F. Tucker, the General Freight Agent of the company, and water being plentiful and easily obtained the building was saved, a monument to Mr. Tucker's ability as a manager of a fire department. It is a great thing for the Illinois Central road that the building was saved, not merely because it saved from destruction a large amount of property, but because its loss would greatly have crippled the company's ability to manage its vast grain business.

The company makes the following statement of its receipts during the month of November:

LAND DEPARTMENT.	
Acres of construction lands sold.....	2,317.15 for \$22,078 86
Acres interest fund lands sold.....	40 for 376 20
Acres free lands sold.....	366.29 for 4,772 42

Total sales during the month of November, 1871..... 2,823.44 for \$27,227 48

To which add town lot sales.....

Total of all..... 2,823.44 for \$27,227 48

Cash collected in November, 1871..... \$64,252 41

## ESTIMATED EARNINGS—TRAFFIC DEPARTMENT.

	In Illinois. 707 miles.	In Iowa. 402 miles.	Total. 1,109 miles.
Freight.....	\$414,554 00	\$30,368 00	\$444,922 00
Passengers.....	106,105 86	38,106 70	144,212 56
Mails.....	6,375 00	3,059 38	9,434 38
Other sources.....	69,000 00	2,440 67	71,440 67
Total, November, 1871.....	\$596,034 86	\$123,974 70	\$719,909 56
Total actual earnings, November, 1870.....	\$665,291 01	\$146,416 50	\$811,707 51
Decrease.....	\$69,256 15	\$22,541 80	\$91,797 95

This is a decrease of 10½ per cent. on the Illinois lines, 18 per cent. on the Iowa lines, and 12½ per cent. in the total traffic receipts.

This company now has cars running through between Chicago and Springfield twice daily. Day coaches leave Chicago for Springfield at 9:30 a. m., and new and elegant sleeping cars leave Chicago at 7:10 p. m., and arriving at Springfield very early in the morning, remain standing on the track until morning, so that one may finish his slumbers in peace in the car.

## Chicago &amp; Iowa.

This railroad will be all finished by the first day of January. On New Year's Day the first through train for Dubuque by this road will leave Chicago, on which date an excursion party of railroad and business men will leave Chicago, the train being under the management of F. E. Hinckley, the President of the company.

The citizens of Clinton, in De Kalb County, Illinois, voted some time ago to issue bonds for \$25,000 in aid of this company, on condition that the company should first actually lay their track from Aurora to Clinton. This the company have done and now await the action of the Clinton authorities. In the meantime, Mr. Pritchard, representative from De Kalb County in the General Assembly, having written to Governor Palmer requesting his opinion as to whether the town authorities were bound to issue the bonds, has received a note from his Excellency, announcing it as his opinion that if the railroad company are able to construct the road without aid, the Clinton authorities are not bound to issue the bonds.

## Chicago, Rock Island &amp; Pacific.

The general offices were removed this week to the corner of Polk and Sherman streets, the old freight building on that corner, which was partially destroyed by the fire, having been rebuilt.

This company is bringing a large amount of building material to the city. Since the first day of November it has brought in 147 car-loads of brick, chiefly from Peoria and Springfield. This would be nearly 800,000 brick, and the company is now using all the extra cars it can spare for the transportation of building material.

## Chicago &amp; Alton.

This company's earnings for the first week in December were as follows:

Earnings from December 1 to December 8, 1871.....	\$98,017 76
1870.....	104,220 85

Decrease (6½ per cent.)..... \$6,203 09

For two or three days at the commencement of the month the Mississippi was impassable at Louisiana, on its branch line. The business of the road is very large.

The stations on the new Louisiana Branch of this road are as follows, the figures indicating the distance of each from Chicago:

Roodhouse.....	236	Nebo.....	260
Drake.....	242	Pleasant Hill.....	265
Happyville.....	245	Pike.....	274
Pearl.....	250	Louisiana.....	276
Stewart.....	255		

And the stations on the Louisiana & Missouri River road are:

Louisiana.....	276	Ladonia.....	306
Watson.....	281	Leroy.....	315
Bowling Green.....	285	Littleby.....	319
Curryville.....	292	Mexico.....	324
Vandalia.....	301		

The Board of Illinois State Railroad Commissioners has commenced an action against this company, under the law passed at Springfield last winter, forbidding companies in the State to charge higher freight rates on one portion of a road than are charged for a greater distance of the same road. The Commissioners have commenced

suit against the Chicago & Alton Company for forfeiture of the charter under this law, complaining that the company has charged more for carrying freight from Chicago to Lexington, Ill., than from Chicago to Bloomington, Bloomington being at a greater distance from Chicago than Lexington. The Commissioners do not complain that the charges for freight to Lexington are unreasonable; but the question to be raised by the action is, in effect, whether a railroad company can make a rate for freight to competing points less than the *pro rata* per mile on the whole line. All railroad companies in this State have been in the habit of making less rates to competing points, in order to obtain business.

The company is represented by the Hon. C. H. Beckwith, of Chicago, and as the case is one which probably could be made against almost every other company in the State, the final decision will be looked for with great interest. The affirmation of the validity of this provision of the law would probably result rather in an increase of rates to competing points than in a decrease to the other stations; that is, it would tend directly to decrease competition.

## Chicago, Burlington &amp; Quincy.

This company has nearly completed its bridge over the Rock River, on the Prophetstown Branch. A delay in the work on this structure has prevented, to some extent, the construction of the branch to its terminus at Clinton. It will be completed to the latter point on the 1st day of January.

## Pittsburgh, Fort Wayne &amp; Chicago.

This company is transporting large quantities of brick to Chicago this winter. It brings 300,000 pressed brick from Philadelphia for a single firm, that of Field, Leiter & Co., and new brick yards are threatening to spring up at various points along the line of the road. A gentleman from Hobart, 33 miles from Chicago, announced his intention to start a brick yard in that place in the spring, and wanted the railroad company to guarantee him the use of five cars a day to transport the brick to Chicago. The company was unable to make the guaranty so long in advance, but will aid the gentleman as far as possible when his enterprise is in running order.

## Chicago &amp; Northwestern.

The general officers of the Chicago & Northwestern Railway Company are the happiest looking set of railroad officials to be found in Chicago since the fire, except perhaps the officials of the Pullman Palace Car Company. The latter will shortly tread on Brussels carpeting in their offices, from top to bottom—a luxury no other railroad men have yet obtained in this city since the fire. But the Northwestern gentlemen have got comfortably seated in a retired, aristocratic mansion on North Union street, with plenty of room, both within the building and without. Every week adds to the evidences that this building is to be the headquarters of the company for some time to come, perhaps till the Great Union Depot shall be finished, which building is, as yet, but dimly foreshadowed.

## Chicago, Danville &amp; Vincennes.

This road is now in good running order. There is one passenger train daily between Chicago and Danville, which leaves the Pittsburgh, Cincinnati & St. Louis depot at 7:00 a. m. and reaches Danville, 128 miles, at 1 o'clock p. m.; leaves Danville at 9:30 a. m. and reaches Chicago at 3:20 p. m. There is also an accommodation between Chicago and Muncie, leaving Muncie at 6:00 a. m. and reaching Chicago 8:50 a. m.; leaving Chicago at 5:05 p. m. and reaching Muncie at 7:55 p. m. There is at present one freight train only, which runs between Chicago and Waukegan, 82 miles. At Waukegan is the crossing of the Toledo, Peoria & Warsaw Railway.

The stations on this railroad and their distances from Chicago are as follows:

	Miles.		Miles.
Chicago.....	0	St. Anne.....	64
Dolton.....	20	Papineau.....	69
Thornton.....	25	Waukegan.....	82
Glenwood.....	27	Milford.....	93
Bloom.....	30	Lovejoy.....	99
Crete.....	33½	Hoopston.....	104
Goodenow.....	37½	Roseville.....	110
Beecher.....	41	I. B. & W. Junction.....	127½
Grant.....	48	Danville.....	128
Muncie.....	54		

The officers of this road at present are as follows:

President, W. D. Judson, New York; Treasurer, A. Tenney, New York; Superintendent, J. A. Wood, Muncie, Ill.; General Freight Agent, Charles Greenwood; General Ticket Agent, C. B. Mansfield.

The passenger depot is the old Milwaukee depot, on the southwest corner of Kinzie and Clinton streets. This road promises to be a popular route to Terre Haute, Evansville, and other points, since it shortens by several hours the time which has heretofore been required to reach those places. The time now between this city and Terre Haute is about 8 hours, whereas by the old routes it was not less than 12 to 14.

## Baltimore, Pittsburgh &amp; Chicago.

This company, it is reported, is likely to find an entrance into Chicago over the track of the Illinois Central, forming a junction with it at Calumet station, 14 miles below Chicago and close to the Indiana line, and will unite with that company, the Michigan Central and the Chicago, Burlington & Quincy in a union passenger depot on the lake shore, provided the ground can be secured. In this case, it is said the railroad companies will wish to obtain the Lake Park ground as far south as Van Buren street, which is just half a mile south of the old depot. As this entire half-mile front is unbroken by streets, it gives an opportunity for the construction of an immense building.

## Pittsburgh, Cincinnati &amp; St. Louis.

On the 3d inst. time was changed on this road, and the train which formerly left Chicago at 7:20 a. m. now leaves at 7:40, the evening express leaves at 7:25 p. m., instead of 7:55; the Louisville and Cincinnati express leaves at 9:10 a. m. instead of 8:40. The changes at the principal stations are indicated in the advertisement on another page.

## Michigan Central.

This road is full of business, having all the freight it can manage. Large quantities of brick are brought into Chicago by this road, as far east as Detroit on the main line of road, and on all the branch roads. The transportation of dressed hogs has just commenced, and promises to be very large. The shipments of live hogs are very large.

On the 1st inst. a new route to Indianapolis, Louisville and Cincinnati was opened via the Michigan Central railroad to Michigan City, and thence by the Indianapolis, Peru & Chicago Railroad to Indianapolis. Sleeping cars run through between Chicago and Indianapolis. Trains run as follows: The daily express leaves Chicago at 6:13 a. m., Sundays excepted, reaches Indianapolis at 5:10 p. m. and Cincinnati at 10:45 p. m. The 9:13 p. m. night express, Saturdays excepted, arrives at Indianapolis at 7:55 a. m. and Cincinnati at 4:25 p. m.

## General Railroad News.

## ELECTIONS AND APPOINTMENTS.

—At a special meeting of the New York Viaduct Railway Company, held November 22, all the members of the old board having resigned, the following were chosen directors:

Alexander T. Stewart, Sidney Dillon, August Belmont, Charles A. Lamont, Jas. F. D. Lanier, Franklin Osgood, Wm. Butler Duncan, Oswald Ottendorfer, Charles L. Tiffany, Wm. R. Travers, Wm. B. Ogden, John Jacob Astor, Abraham S. Hewitt, Levi P. Morton, S. D. Babcock, Wm. Blodgett, James B. Colgate, Jose F. Navarro, Edward B. Wesley, John Taylor Johnston, Andrew H. Green, Wm. H. Appleton and Jos. Seligman.

John Taylor Johnston was elected President. The Secretary, Edward P. Parker, and the Treasurer, Wm. Butler Duncan, retain their positions.

—Colonel Thomas McKissock, it is reported, has resigned his position as General Superintendent of the Missouri Pacific Railroad, and it is rumored that A. A. Talmage, for some time Superintendent of the Atlantic & Pacific, will hereafter have charge of both roads, which are under the same control and operated as one system.

—At the annual election of the St. Louis Club of Civil and Mechanical Engineers all the old officers were re-elected, viz.: Henry Flad, President; Frederick Shickles, Vice-President; William Wise, Treasurer; Charles A. Smith, Secretary.

—At a meeting of the Directors of the Lake Superior & Mississippi Railroad, in St. Paul, on the 28th ult., Charles Elliott Furness was promoted from the office of Secretary and Treasurer of that road to that of Vice-President, and Mr. Thomas M. Davis was elected to fill the offices thus vacated by Mr. Furness.

—J. K. Hornish, of Keokuk, B. W. Davis, of Fort Madison, and O. Fuller, of Monroe, Iowa, have been elected directors of the Keokuk & St. Paul Company to fill vacancies.

—Charles Roadnight, formerly of the Chicago & Alton Railroad, has been appointed General Freight and Passenger Agent of the Atchison & Nebraska Railroad.

—At the annual meeting of the Chesapeake & Ohio Railroad Company, held in Richmond, Va., December 7, the old board was re-elected, and the provisions of the act passed by the last Virginia legislature for the extension and completion of the road were accepted.

—A called meeting of directors of the Indianapolis, Delphi & Chicago Railway Company was held in Indianapolis, December 7. J. M. Ridenour, President, and Messrs. James P. Dugan, Alfred Thompson, James Fulkerson and Wm. A. Braden, directors, resigned. The vacancies were filled by the election of Dr. Winslow S. Pierce, of Indianapolis, as President, and Dr. James H. Stewart, of Delphi, E. P. Hammond, of Rensselaer, and Dr. S. R. Fisher, of Clinton County, directors. The President was invested with full powers and instructed to work up county and other subscriptions.

## TRAFFIC AND EARNINGS.

—The following were the earnings of the Toledo, Wabash & Western Railway for November:

1871.....	\$331,079 68
1870.....	425,687 03

Increase (25 per cent.)..... \$105,392 65

Total increase for 11 months..... 1,192,400 36

—The earnings of the Lake Shore & Michigan Southern Railway for the third week of November were \$308,888 in 1871, and \$291,255 in 1870, showing an increase of \$17,633, or 6 per cent.

—The receipts of the Pacific Railroad of Missouri for the second week of November were \$78,614 in 1871, and \$76,603 in 1870; and for the third week, \$86,103 in 1871 and \$77,756 in 1870.

—The earnings of the Union Pacific Railroad Company for the months of November, 1870 and 1871, are reported as follows, viz.:

November, 1870—Gross.....	\$570,000
Expenses.....	272,000

Net..... \$298,000

November, 1871—Gross.....	\$598,000
Expenses.....	310,000

Net..... \$288,000

Increase in the gross earnings (27 per cent.)..... 153,000

Do. net earnings (42 per cent.)..... 115,000

The monthly settlements with connecting lines, which will be made on the 20th proximo, will, it is estimated, increase these amounts fully 10 per cent. The net earnings for the eleven months of the year 1871, to December 1, will, it is estimated, show an increase of \$1,250,000 over the corresponding period of last year.

—The traffic receipts of the Great Western of Canada for the week ending November 17 amounted £19,577,



against \$16,966 in the corresponding week of last year, showing an increase of \$2,611, or 16 per cent.

—The Milwaukee & St. Paul Railway Company reports earnings as follows:

FROM NOVEMBER 1ST TO THE 30TH.			
Freight	\$588,961 95	\$460,579 16	\$128,382 79
Passenger	149,574 08	139,108 51	10,465 57
Mail, express, &c.	52,677 74	44,943 50	7,734 24
Total	\$791,014 37	\$644,631 17	\$146,383 20
Total decrease			146,383 20

FROM JANUARY 1ST TO NOVEMBER 30TH (11 MONTHS).			
Freight	\$4,768,109 11	\$4,100,489 06	\$667,620 05
Passenger	1,615,748 55	1,600,245 06	15,503 49
Mail, express, &c.	507,445 31	516,666 04	9,220 73
Total	\$6,891,302 97	\$6,217,400 16	\$673,902 81
Total decrease			\$673,902 81

The decrease is seen to be almost entirely in freight, which is less by one-seventh than in 1870, while the passenger receipts have declined less than 1 per cent.

—The earnings of the Lake Superior & Mississippi Railroad for the week ending November 30 were \$11,724 44.

—The traffic receipts of the Grand Trunk of Canada for the week ending November 18 amounted to \$37,400, against \$30,700 in the corresponding week of last year, showing an increase of \$6,700, or 22 per cent.

—The New York *Bulletin* gives the following account of the movement of traffic by canals during the past season:

"The past season has been one of unusual activity in the movement of freights by canal in almost all parts of the country. The business of the canals of this State shows a most satisfactory increase. The shipment of corn has been four times as great as last year and amounts to 18,472,200 bushels, against 4,662,700 bushels in same time last year, an increase of 13,809,500 bushels; and by reducing the wheat to flour, the quantity of the latter left at tidewater this year, compared with the corresponding period last year, shows an excess equal to 636,500 barrels. The receipts for tolls for the current year were \$2,927,424, against \$2,463,169 in the same time last year—an increase of \$464,255. Reports from other quarters are equally favorable. The coal tonnage of the Schuylkill Canal has been nearly double that of last year, being 965,903 tons, against 519,460 tons last year. The business of the Delaware & Raritan Canal shows an increase almost as great, while the tonnage movement by the Morris Canal has been greater than for any year since 1864, although coal shipments were suspended for thirteen weeks on account of the strike. The Lehigh Navigation and Delaware Division Canal have done a business about equal to that of last year, notwithstanding the long suspension of mining operations. The business of the Chesapeake & Ohio Canal shows an increase of 30 per cent. in coal tonnage alone, and that of the Chesapeake & Delaware is steadily improving. Everywhere the canals have done an increased business, notwithstanding the active competition of the railroads, and in this fact is found the fullest refutation of the idea which seems to prevail that the usefulness of our artificial water ways is past. When a practical solution of the question of steam traction shall be reached the importance of our canals will be more apparent, and, consequently, more generally appreciated than at present."

## OLD AND NEW ROADS.

### Cohoes & Waterford.

A company has been organized to construct a railroad two miles long, from a point near the canal bridge in the manufacturing city of Cohoes, N. Y., to the village of Waterford.

### Virginia & North Carolina.

Under this name the new Lynchburg & Danville Railroad Company has agreed to consolidate with the old Orange, Alexandria & Manassas Company.

### Cincinnati & Dayton Short Line.

Of the 48½ miles of this new railroad, 45 are to be ready for the iron by this date, and the remainder by February. There is a great deal of very heavy work on this line.

### Tuckerton Railroad.

This railroad, extending from Whiting's Station, on the New Jersey Southern 47 miles below Sandy Hook pier, southward 29 miles to Tuckerton, N. J., has been opened recently.

### Bonny Eagle Branch.

This is the name of a railroad it is intended to build from the Portland & Rochester road at Buxton, Me., along the Saco River to Bonny Eagle Falls. A. K. P. Lord is President.

### Whitehall & Port Henry.

The Delaware & Hudson Canal Company has been surveying a route for a railroad from Whitehall, N. Y., northward near the west bank of Lake Champlain, past Ticonderoga to Port Henry, and it is reported that a favorable route has been found and that the road will be put under contract immediately. Hitherto the country along Lake Champlain has been pretty much out of the world during the winter.

### Boston, Nashua & Acton.

Ground was broken for this railroad, at Nashua, N. H., on the 11th inst.

### Vermont & Massachusetts.

This company has reduced its passenger tariff from 4 cents per mile to 3½ for local rates, and to 3 cents for through rates to Boston.

### Connecticut Western.

The line is now completed from Hartford to Millerton, and there will soon be regular trains from Dutchess Junction, New York, to Hartford.

### Union Depot in Portland.

The people of Portland, Me., are talking of a union depot for all the railroads entering the city, to be constructed in the rear of the city.

### Martinsburg & Potomac.

This is the northern section of the railroad which the Pennsylvania Railroad Company hopes to construct up the Shenandoah Valley. Parties in Berkeley county, Va., which had voted a subscription of its bonds in aid of this road, brought suit for an injunction to restrain the assessment of a tax on account of these bonds, but the court has refused the injunction and affirmed the validity of the bonds.

### Connecticut Valley.

The Boston *Advertiser* reports that the unexpected and sudden close of navigation throws an immense freighting business upon the new Connecticut Valley Railroad, which is ill-prepared to take care of it, having neither sufficient cars nor sufficient storage accommodations. Not only are the New York boats discharging their freight at Saybrook, but a host of sailing vessels are unloading coal, lumber, iron, etc., there. Cars now run alongside of the boats and take off freight direct.

### Worcester & Willimantic.

A new railroad project is discussed for a line from Worcester, Mass., to Willimantic, Conn., using the Norwich & Worcester road as far as North Oxford, and thence going direct to Willimantic by way of Southbridge.

### Logansport, Crawfordsville & Southwestern.

Last year a short section of this railroad was completed from Colfax, Ind., a station on the Indianapolis, Cincinnati & Lafayette Railroad 21 miles southeast of Lafayette, northeast ten miles to Frankfort. This year it has been extended from Frankfort northeast five miles to Kilmore, and from Colfax southwest 32 miles to Waveland, forming a line 47 miles long. It is intended to extend it southeast about 12 miles to Rockville, the northern terminus of the Evansville & Crawfordsville Railroad, and from Kilmore northward about 40 miles to Logansport. It would thus connect the Evansville & Crawfordsville with the Toledo, Wabash & Western, to which latter road it would form a good feeder.

### Peoria, Atlanta & Decatur.

Most of the grading and bridging is completed on this road between Peoria and Atlanta, Ill., 35 miles. The Peoria Transcript says that parties interested in the Toledo, Peoria & Warsaw Railway have nearly completed an agreement to complete the line and operate it in the interests of that road, for which it is not well situated, as it extends southeast from Peoria.

### Springfield & Northwestern.

The Lewistown (Ill.) *Democrat* is informed that an extension of this road from its present terminus at Havana, on the Illinois River, northward to Lewistown, on the Buda Branch of the Chicago, Burlington & Quincy Railroad, will be completed next spring. Surveys have been made as far north as Galesburg.

### Waconia Central.

The following are the stations on the part of this railroad in operation, between Menasha and Stevens' Point:

	MILES.		MILES.
Menasha	0	Waukegan	35
Medina	11	Amherst	48
Hill's Landing	24	Stevens' Point	63
Weyauwega	27		

Forty or fifty miles more will be completed soon, and will make accessible a large amount of farming and timber land belonging to the company, which will be offered for sale.

### St. Louis & St. Paul.

It is reported that as soon as the Burlington, Cedar Rapids & Minnesota Railroad has been completed to a junction with the Macon City & Austin Branch of the Milwaukee & St. Paul Railway, which will be in a short time—probably by the end of the year—through passenger trains will be run from St. Louis to St. Paul, from St. Louis to Bushnell moving on the Rockford, Rock Island & St. Louis road; from that point to Burlington on the Toledo, Peoria & Warsaw, thence to a point near Mason City, Iowa, on the Burlington, Cedar Rapids & Minnesota, and from thence to St. Paul, on the Milwaukee & St. Paul.

### St. Cloud & St. Peter.

A survey has been made of a new route for a proposed railroad from St. Peter, Minn., nearly due north to St. Cloud, which is on the Mississippi River Division of the St. Paul & Pacific Railroad. Such a road might be operated either to carry produce to Chicago and Milwaukee or to Duluth.

### Milwaukee & Northern.

Wisconsin papers report that the company has struck two subterranean lakes, one in Saukville and the other in the tamarack swamp crossed by the road in the town of Fredonia. In the latter a portion of the grading suddenly disappeared from view, sinking to a depth of twenty-nine feet. These "sinks" have been refilled and the grading brought up to its former level, so that no delay will be experienced through these unexpected breaks in the line.

### Savannah & Memphis.

This Alabama railroad is now in operation from Opelika, on the Western Railroad of Alabama (late the Montgomery & West Point) 22 miles southwest of West Point, northwest 20 miles in the direction of Dadeville.

### Moncks Creek Railroad.

This railroad, which now runs from Winchendon, Mass., to Peterborough, N. H., is to be extended 18 miles to Hillsborough Bridge next spring and summer, making the distance from Winchendon and Keene by rail 29 miles less to Concord than at present. The delinquent stockholders who refused to pay their subscriptions and were beaten at the late trial expect to gain their point at the law term, as they claim the subscriptions were made on the condition that a cert. in amount of stock should be taken in New Hampshire, whereas it was in fact taken by Massachusetts men. The distance from Keene to Concord by turnpike is 40 miles; by rail, via Groton Junction, Mass., and Nashua, N. H., about 111 miles; via Winchendon, 82 miles.

### St. Louis, Lawrence & Denver.

This railroad, which extends from the Missouri Pacific, at Pleasant Hill, 34 miles southeast of Kansas City, westward 58 miles to Lawrence, Kansas, which is on the Kansas Pacific 38 miles west by south from Kansas City, and is quite commonly known as the Lawrence & Pleasant Hill road, was completed December 2. It was intended as a cut-off to Kansas City, enabling the Missouri Pacific to reach Lawrence directly and by a route 14 miles shorter than the old one. Lawrence is now but 24 miles further from St. Louis than is Kansas City, and a mile nearer than Leavenworth. The road has been completed by the aid of the Missouri Pacific, which is to lease and operate it. It will be to this road very much what the "Joliet Cut-off" is to the Michigan Central. At Olathe it can receive any through freight to or from St. Louis from or for the Missouri River, Fort Scott & Gulf and the Leavenworth, Lawrence & Galveston roads, and it ought to prove a valuable feeder to the lessee.

### Burlington & Missouri River.

This company's sales of lands in Iowa during the month of November were 2,227.48 acres, at an average price of \$13.38 3-10 per acre, amounting to \$29,810.36.

### Fort Scott, Humboldt & Western.

This company, which has a road-bed nearly completed from Fort Scott west to Humboldt, Kansas, has, it is reported, negotiated its bonds and closed contracts for the iron to complete that part of its road.

### Missouri, Kansas & Texas.

Concerning the northern extension of this road, Capt. Joseph L. Stephens, of Booneville, Mo., says that the grading has been completed from Sedalia to Booneville, with the exception of about four miles, if they raise temporarily the track of the O-ave Valley road from Beardstown into Booneville, and if not, then there remains ungraded seven miles. From Booneville to Fayette, where a junction with the Louisiana & Missouri River road will be made, the road is all graded.

### Connecticut Central.

On the 4th inst. a vote was taken a second time in East Windsor, Conn., on the question of subscribing \$50,000 to this road, and a second time the proposition failed to pass.

### Cincinnati & Terre Haute.

This company, of which Gen. Alfred Pleasanton, late Commissioner of Internal Revenue, is President, has established an office at No. 98 Broadway, New York, and opened books for subscriptions to the capital stock.

### Cincinnati, Rockport & Southwestern.

A correspondent who is engaged on this road writes to us of it as follows:

"This new road will connect Rockport, Ind., on the Ohio River, and Mitchell, Ind., the crossing of the Ohio & Mississippi and the Louisville, New Albany & Chicago railroads. It will pass through a fine agricultural region, rich in deposits of coal and iron ore. The line is located from Rockport to French Lick Springs in Orange County. The contract for building the road from Rockport to Jasper, Dubois County, is let to Branham & Cobb, and they began work vigorously November 15. The senior member of the firm, Mr. D. C. Branham, late General Superintendent of the Indianapolis & Vincennes Railroad, is a man of great experience and fine ability, and will push the work to an early completion. Josiah Kirby, of Cincinnati, is President of the company; E. H. Sabin, of Rockport, Vice-President; H. H. Tatum, of Cincinnati, Secretary and Treasurer; and T. D. Lovett, of Cincinnati, Chief Engineer."

### Milwaukee & St. Paul.

This company's temporary winter bridge over the Mississippi at Prairie du Chien was completed on the 1st inst. Trains cross as over a permanent bridge and the communication is better than in the summer.

### Snow in the Far West.

The Union Pacific has suffered more from snow this season than ever before since it was opened, a severe storm having caused delays pretty early in October. The Kansas Pacific has been blocked nearly or quite as much, and the Denver & Rio Grande, the new narrow-gauge road, was blocked for some time. The snow is said to have been remarkably heavy.

### Council Bluffs & Omaha Bridge.

The Council Bluffs *Nonpareil* of the 1st inst. says: "Friday five cars laden with iron arrived at the river from the East, marked 'First Span, Iowa Side.' It is thought that work upon the two spans at this end of the bridge will be commenced at once. Already the three spans nearest the Nebraska shore are completed, and the work upon the fourth is rapidly progressing. There will be eleven in all, each of them 250 feet long, and it is expected that before spring they will all be in place. On the Nebraska side, the filling between the abutment and the bluff is being made. On this side the grade requires ten feet more to bring it up to the proper height, and for this nearly a million more cubic yards of earth are needed."

### Fort Huron & Lake Michigan.

This railroad, which has dragged somewhat of late, was formally opened to Flint, Mich., on the 6th inst.

### Chicago, Continental & Baltimore.

Articles of association of this company were filed at the Secretary of State's office, at Indianapolis, on the 8th inst. The proposed line will run through the counties of Lake, Porter, Laporte, Stark, Marshall, Fulton, Wabash, Wells and Adams, in Indiana, a distance of 165 miles. Capital, \$5,000,000. This is to be the Indiana portion of the Baltimore, Pittsburgh & Chicago Railroad.

### Pennsylvania Railroad.

The New York *Times* says: "Private telegrams from London advise that Messrs. Junius S. Morgan & Co. have borrowed \$5,000,000 for the Pennsylvania Railroad Company on the debentures of one of their leased lines, the Philadelphia & Erie road, and report is that the offers in this negotiation amounted to \$12,500,000, or two and a half fold the sum required."



**Lake Superior & Mississippi.**

This company has a permanent lease of the new Minneapolis & St. Louis Railway, recently completed from Minnesota to Carver, and is now operating it. The line will more probably be operated in the interest of Duluth than of Minneapolis, for which it was especially designed.

**Union Pacific.**

This company's temporary winter bridge across the Missouri River at Omaha is completed, so that cars can be transferred readily.

This company has brought suit against Thomas C. Durant, formerly Vice-President of the company, to compel him to deliver to it deeds of property, said to be worth now about a million of dollars, which he received from citizens of Omaha in trust for the company. He claims that the property was subscribed to the company on condition that it should maintain its terminus in Omaha, and that it has lost its claim by establishing its terminus in Council Bluffs.

**Orange, Alexandria & Manassas.**

The annual meeting of this company was held in Alexandria, Va., November 30. President Barbour's report states that the gross earnings of the road the past financial year amounted to \$913,295; and after deducting expenses the net earnings were \$359,535. The road is in good condition, with increasing freight and passenger business. The report calls attention to a land scheme, and to certain acts of the Legislature affecting the road, urging particularly the adoption of the provisions of the act for consolidating this road with the Lynchburg & Danville Railroad. All acts of assembly in reference to the road were adopted, and President Barbour and all the old officers were unanimously re-elected.

**Monmouth County Agricultural Railroad.**

This company was chartered four years ago, but has but just got under contract. The line extends from Freehold, N. J., on the Jamesburg Railroad, northeastward 13½ miles to Keyport, on Raritan Bay, 21 miles from New York, with which it has daily connection by steamer. The contract was let about a month ago to Mr. A. Jackson, of Middletown, N. Y., who has recently completed a contract on the Midland road, who is to complete it ready for operation for \$256,000, and by the fall of next year.

The distance from Freehold to New York by the present route is quite circuitous and 57 miles long, and the new one will thus save 23 miles of the distance. When the Long Branch road is completed, it will have a rail connection with New York not much longer than that across the bay. The officers are Christian D. Empson, Keyport, President; Treasurer, Thomas V. Arrowsmith, Freehold; Secretary and Chief Engineer, Alfred Walling, Jr., Keyport. Christian D. Empson, Keyport; Thomas V. Arrowsmith, Jacob Rue, Freehold; Wm. H. Conover, Jr., Freehold; Daniel Van Dorn, Marlborough; Wm. H. Hornor, Mattawan; Henry W. Seabrook, Cornelius Britton, Keyport; Edward Ellsworth, New York, Directors.

**Chicago & Michigan Lake Shore.**

The extension of this road from Montague to Pentwater has been delayed somewhat by the delay in the arrival of iron, but track has been down a week or more as far as Greenwood, six miles north of Montague, and the grading is well advanced.

An engine house for two locomotives is to be built at New Buffalo, the southern terminus of the road, one for five at St. Joseph, one for two at Grand Junction, and one at Holland and one at Muskegon for one each.

**Chesapeake & Ohio.**

At the annual meeting of this company, in Richmond, on the 7th inst., the only notice taken of the action of the City Council of Richmond in appropriating \$200,000 towards a tunnel through Church Hill, which would enable the road to reach the steamer landing on the James, was an expression of a hope in President Huntington's report "that the citizens of Richmond will at an early day propose to the company such rights of way and other facilities through the city to the river as will be mutually beneficial and acceptable."

**Rockford, Rock Island & St. Louis.**

Hitherto this company has sent all freight shipped for Chicago at its stations by way of Sterling (its northern terminus) and the Chicago & Northwestern Railway; but now the freight received at stations south of Rock Island is shipped by the Chicago, Rock Island & Pacific road, by which the distance to Chicago from Rock Island is about 20 miles greater than via Sterling and the Northwestern.

The Rock Island Union reports that the passenger business on this road between Rock Island and St. Louis has greatly increased since the closing of the Mississippi.

**Florida, Memphis & Columbia River.**

The company with this overwhelming name has surveyed a route for a railroad from Ritchie, Mo., on the Atlantic & Pacific Railroad 30 miles east of the point where it enters the Indian Territory, westward through Chetopa, Kansas, and thence northwest to Thayer, on the Leavenworth, Lawrence & Galveston Railroad. Agents are soliciting subscriptions from the towns on the route.

**The Rock Island Bridge.**

The most of the force is now engaged on the draw span of this bridge, which will be 366 feet long and require 750 tons of iron. Work on the third span from the Iowa shore will be commenced very soon. The false work for the fourth and last span will not be commenced until the river is frozen over under it.

**Chicago & Superior.**

The Rockford (Ill.) Journal says that the directories of the Madison & Portage and Sugar River Valley companies of Wisconsin, and the Rockford Central Company of Illinois agreed upon terms of consolidation under this name, at a meeting in Madison, Wis., on the 6th inst., and that James Campbell, President of the Madison & Portage Company, was chosen President, and R. P. Lane, President of the Rockford Central, Vice-President.

**Grand Rapids & Indiana.**

Governor Baldwin, of Michigan, on the 5th inst., accepted the 20 miles of this railroad between Paris and Leroy, which has been completed this year.

**Pinet & Pere Marquette.**

On the 6th inst., 40 miles of this railroad, constructed this season, from Clare west to Hersey, was accepted by the Governor of Michigan. The road is now completed to a junction with the Grand Rapids and Indiana road, three miles west of Hersey.

**Jackson, Lansing & Saginaw.**

Thirty miles of this railroad, constructed this year, from Kawkawlin northward to the north line of Bay County, was accepted by the Governor of Michigan December 6.

**North Missouri Central.**

A telegram to the Missouri Republican says that, on the 5th inst., articles of sale for transferring the North Missouri Central Railroad, with all its privileges, rights and franchises, and all its property, real, personal and mixed, to the St. Joseph & Iowa Railroad Company, were filed with the Secretary of State of Missouri. The largest stockholders of the railroad were Samuel Thorns, Thos. N. Edwards and Joseph Combs.

**New Railroads to Washington.**

The Washington correspondent of the New York Times, under date of December 11, says:

"In less than sixty days the Baltimore & Potomac Railroad will be running trains between this city and Baltimore, and by the 1st of May next it will be possible to enter a palace car at Washington and get out of it at Chicago. At the same time the new Metropolitan Branch, or short line of the Baltimore & Ohio Railroad, from the main stem at Point of Rocks to Washington, will be in operation. This line shortens the time two hours between Washington, Pittsburgh, Columbus, Cincinnati and the West. In the meantime a line is being constructed from Alexandria to Fredericksburg, under the auspices of the Pennsylvania Central Railroad, which will be completed next season, placing Richmond within four hours of Washington, and dispensing with the river ride on the Potomac. There will, without doubt, in the near future, be constructed a road, for which a charter has been granted by the Virginia Legislature, known as the Washington & Ohio road, destined to effect a still shorter line to Cincinnati and to the West. At the late election the District voted its credit to the extent of \$600,000, to aid in the construction of such a line. There appears, however, to be some ambiguity in the terms of the act, under which the credit was voted, and Gov. Cooke expresses an intention of enforcing a correct interpretation of the object of the act before consummating the delivery of the bonds. But, independent of this, in less than a year from this time, Washington will be accessible from the North, South and West by five lines of railroad, instead of two as now."

**Municipal Aid to Railroads in Kansas.**

The Lawrence (Kansas) Tribune of the 3d inst., says:

"The railroad-bond system has undoubtedly added a good deal toward the progress of railroads in Kansas, but it is getting to be fearfully large. Enough is enough of anything. The first railroads built in Kansas went slowly and seemed to need aid, and that aid was given liberally. Seeing the anxiety of the people on railroads, speculators rushed in and went to work to get up franchises for roads unprecedented in the history of any country. From county they went to city and village and then to township bonds. There may be places where sound policy would dictate the issuing of bonds, but the indiscriminate issue now going on can only lead to ruinous consequences."

"In Wisconsin the first project of railroads was to get the land owners, principally farmers, to subscribe stock and give mortgage security for payment, and this was done on the assurance that the dividends of the road would pay their interest and the stock sell for the principal before the mortgages became due. The result was that the railroads were sold out to new parties, and the farms were sold to pay up for the stock, which was worthless. What is true of individuals will be true of counties, only that probably the railroads will get all the county and township and town subscriptions without giving any stock. It makes but little difference which way it should be done. The effect is the same. Little townships are subscribing more bonds than they will ever be able to pay."

"The aggregate of the bonded indebtedness of the people of the State of Kansas we have now no idea of. We should not be surprised if it amounted to \$30,000,000. There are several counties which run up to over a million dollars. We may boast that we have little or no State debt, which is the result of a wise provision of our State constitution prohibiting a debt above a million of dollars; but this debt of counties, cities and townships has to be paid out of the resources of our people, and it matters not what kind of indebtedness. It will oppress and impoverish and injure the State as much in one way as the other. It is high time that a stop should be put to it."

**Leavenworth, Lawrence & Galveston.**

The railroad bridge at Lawrence, Kansas, is progressing rapidly to completion.

A branch of this railroad is nearly finished from Cherryville to Independence, a distance of about 10 miles. The latter is a place of considerable importance, being the county seat of Menominee County, Kansas.

**Virginia State Railroad Shares.**

A telegram from Richmond announces that, in accordance with the act of Assembly passed last session, the Board of Public Works will, on the 5th of February next, sell at auction the State's interest in all works of internal improvements, including 2,752 shares of common stock in the Richmond, Fredericksburg & Potomac Railroad; 20,140 shares in the Chesapeake & Ohio Railroad; 4,910 shares in the Richmond & York River Railroad; one bond for \$4,000,000 of the Atlantic, Mississippi & Ohio Railroad Company, secured by a second mortgage on the

road; a balance of \$427,000 due by the Richmond & Danville Railroad, secured in a mortgage; three bonds of the Alexandria, Loudoun & Hampshire Railroad Company for \$16,954 each; 74,000 shares preferred stock in the James River & Kanawha Canal Company, and 30,000 shares common stock, of par value of over \$281,000, in the Chesapeake & Ohio Coal Company; shares of common stock in the Kenapville Canal Company of par value of nearly \$14,000; Rivanna Navigation Company, par value of \$269,000; Roanoke Navigation Company, par value of over \$269,000; Roanoke Navigation Company, par value of \$30,000, and Upper Appomattox Navigation Company, par value of \$50,000. Also the State's interest in nine plank road companies, eighty-six turnpike companies and four bridge companies.

**Missouri Railroads in 1871.**

Governor Brown in his late annual message speaks as follows of the railroads of Missouri:

"Our railroads have shown very satisfactory progress during the year. Many new lines have been projected; many others have been partly constructed and some few have arrived at completion. The extension north to connect with the lines of Iowa and Nebraska, together with those south, to gather up the communications of Arkansas and Texas, promise to bring the productions of the extremes of the temperate zone into our midst, for exchange and conversion. The southwestern road is pushing into the Territories, to open up the splendid area of the Indian nation. Branches that intersect the coal-fields unite upon trunk lines with branches that penetrate the iron beds, thus organizing an immense manufacturing future. Sections of the State of unsurpassed fertility, that have been beyond the reach of market, are now enjoying the benefit of most direct and rapid intercourse with the centers of trade. Abundant capital for all internal improvements that offer any fair return upon investment is found ready to engage, and if any fault may be found, it is that our citizens in all corporate capacities have been only too eager in proffers of aid and subscription of bonds. These facts, however, may be best exhibited by presenting a summary of returns that have been called for, showing the condition of the railroads of Missouri. It is believed that there are no omissions that will affect to any considerable degree the general aggregate. The detailed statement is appended. The synopsis is as follows:

Number of miles completed and in operation January 1, 1871.....	1,980
Number of miles in course of construction January 1, 1871.....	797
Number of miles built from January 1, 1871, to November 1, 1871.....	560
Number of miles in course of construction November 1, 1871.....	1,132
Number of miles (estimated) completed and in operation January 1, 1872.....	2,750
Capital invested in railroads, rolling stock and apparatus.....	\$117,548,317

"The management of these roads has been on the whole judicious, although some accidents, involving serious loss of life, have occurred which might, perhaps, have been avoided by greater care and better equipment. It must be evident to you, however, that it is only trifling with the public welfare to permit such a vast system as it has now become, to go forward longer without some control and supervision being exercised by the State, through its appointed agents, designated expressly for that purpose. It may be that in one respect, the rates of fare and freight, the more important companies are exempt for a term of years from legislative control. But be that as it may, it is none the less incumbent on the State to insist upon an inspection in all that concerns the security to life in passenger transfer, the equal facilities to freight, the uniformity of charge to all, the systematic dispatch of trains, the making with each other proper connections; the establishment of telegraphic lines and stations, and other details that subsequently come within the scope of police regulation. There are, it is true, those who contend that the State has no power, charters having once been granted, to interfere thereafter through its legislative department, to control railway management in these and other essential matters. As has been forcibly said, that would be to assert that a power had grown up under the State, by leave of the State, within the State, yet greater than the State. No such thought can be ever recognized among a free people. Such right is of the sovereignty of the State, and can neither be given away nor contracted away. I therefore renew to you most urgently the recommendation made at your last session, that you create by law a Railroad and Telegraph Commission, invested with such powers, and under such restrictions, as you may deem sufficient to answer the ends of public protection. I am aware that it is an invidious task to insist upon such requirement, confronting large corporations sensitive to any measure that may seem to touch even remotely their interests. I recognize, too, that the problem is not without its difficulty—a difficulty always present when the line is attempted to be drawn between the immunities that attach to private investment and the superior control that must reside somewhere in any social state. But I am equally well satisfied that such action will redound eventually as much to the advantage of the railroads themselves as to the public at large. Liberality of treatment to the extreme, consistent with higher duties, should be extended to these great instrumentalities that have done so much to pioneer us into a magnificent prosperity. In Missouri they have certainly had encouragement after encouragement showered upon them with no stinted hand. Their construction in every instance claims familiar relations with the taxes levied upon the people. And while, therefore, nothing should be demanded of them inconsistent with the legitimate use of their property, yet in view of the powers they hold from the State, neither should they shun any proper responsibility to its supreme authority."

**Pittsburgh & McKeesport Car Company.**

This company is constructing the Kirkwood & Merriamton patent coal car, which has two iron dumping-boxes which spill in the centre. The company has constructed some narrow-gauge locomotives. The shops cover 140 by 180 feet, and give employment to about 100 men. J. N. Shallenberger is in charge.